JOURNAL OF GAS LIGHTING, WATER SUPPLY, &c.

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EDITORIAL NOTES—GAS, &c.

The Gas Industry and the Mines (Eight Hours) Bill.

COMPLETELY courteous and sympathetic was the reception the Home Secretary gave to the deputation of the Institution of Gas Engineers and the Gas Companies' Protection Association who waited upon him on Thursday, on behalf of the gas industry, to adequately put before him the feared pernicious effects upon the gas industry if the Mines (Eight Hours) Bill becomes law. Not only was Mr. Gladstone courteous and sympathetic, but he very heartily welcomed the assistance that was rendered to him in properly appreciating and investigating a (to him) fresh side of the question, and thus putting him in a better position to place its various aspects before his colleagues. While it is true the Bill will, in the first instance, have to be settled by the House of Commons, we cannot overlook the fact that Mr. Gladstone's influence is paramount in this particular matter. He could doubtless even sway the Chairman of the one Gas Company who declined to support the deputation in this matter; and the Chairman of which Company is a Member of Parliament, and sits on the Government side of the House. It kindles encouragement when a Cabinet Minister in charge of a Bill admits that a deputation antagonistic to the measure has put before him a phase of the question under consideration that he is afraid has been too much neglected in the House, and a phase which, in this instance, he honestly thinks it is essential should be considered in the interests of both the small and the large coal consumers in the country. Those whose addresses drew this admission from Mr. Gladstone were Sir George Livesey and Mr. W. Doig Gibb (the latter the President of, and both representing, the Institution of Gas Engineers), Mr. H. E. Jones, the Chairman of the Gas Companies' Protection Association, and Mr. Hanbury Thomas, the Managing-Director of the Sheffield United Gas Company. Parliamentary duties prevented Mr. Corbet Woodall, as Governor of the Gaslight and Coke Company, remaining with the deputation long enough to give his support to the representations of the deputation. Sir George was the chief spokesman; and it was a masterly speech that he made. His candour and the simple boldness and directness of his points, it was obvious, appealed forcibly to Mr. Gladstone; and it is to be hoped the impression will be lasting, and have an operative effect. Anyway, he cannot avoid recognizing that the agitation against the measure is a powerful and far-reaching one. It is not the agitation of a rabble of frenzied fanatics; but an agitation by serious-minded men of business, who see in the Bill incipient dangers that will, in their multiform development, overwhelm the prosperity of industry and of the masses of the people.

A good starting-point was made by Sir George when he said that, in his study of the Bill, he had seen many valid reasons advanced against it, but he could not discover that a single substantial reason had been put forward in its favour by the real instigators of the promotion of the ill-conceived measure. With this submission, there is full agreement; and therefore there is nothing left but to deal with some of the anticipated—anticipated on the soundest of reasoning—evil effects of any statutory limitation of the working day in coal mines. The question of a shortage of supply is not of supreme importance; the coal owners will see to it that their interests are not derogated by shortage of coal as a consequence of a statutory curtailment of the hours of labour of the individual. But the ways and means of preventing any shortage is the serious matter for industry and private consumers; and it is impossible, looking at the matter in the most generous spirit that one can, to see how preventive ways and means can have any other effect than an increase in both the standing charges of the colliery owners and the cost of labour, which will devolve entirely on the unfortunate consumer. Mr. Gladstone points out that there is a margin to fall back upon between the hours worked now by the men and the eight-hour restriction; but if this margin is an effective one from the preventive point of view, then the puzzle is to find the *raison d'être* for the Bill. But to pass from that questionable margin, if the Home Secretary had deliberately set himself to discover reasons hostile to the Bill, he could not have produced anything better than the means he suggested as palliatives in considering a possible shortage of output. He suggested that the Bill would bring about the absorption of a greater body of men, the opening of new pits, the working of two eight-hour shifts, and the greater use of mechanical coal cutting—all of which would inevitably increase standing and working costs.

Take the question of adopting two eight-hour shifts, and consider it in relation to the absorption of present unemployed men. The plan would be the means of bringing into being something altogether factitious in place of the natural law of supply and demand as applied to labour. It is to be seriously doubted, even when the demand for coal is at its height, whether the colliery owners could give anything like full-time employment to two shifts of men week in week out. And when the demand for coal is bad, there would unavoidably be a greater army of unemployed congregated in the concentrated coal-mining districts; and the guardians under the poor law would be promptly made to feel one of the serious effects of a mischievous enactment. The last state would be worse than the first; and discontent and poverty would be rife, through the attenuated opportunity for securing a livelihood. The demand for coal, and not statutory limitation of hours, must always be the controlling factor in the employment of the men. If in times of heavy demand the rule of two shifts is not adopted, then an alternative is the engagement of casual labour to supply the difference above the normal. Migratory casual labour is always dear; it is not the same thing as the skilled labour of the every-day workman. The attraction of casual labour to the coal-fields would also have the same ill-effect of concentrating at certain periods in the mining districts a far greater number of needy unemployed than has hitherto existed. The fact of the matter is that, however contemplated, it is patent that in the coal-mining districts the regularity of employment is seriously jeopardized by this Bill; and that is not what the working miners of to-day are expecting as the direct consequence. It is an irrational Bill; and the effects of such irrationality are only likely to be material in evil. But what think those who (a consensus of public opinion did not do it) incited the promotion of the Bill of the Home Secretary's suggestion to all those whom it may concern, that in this country we are much behind other countries in the use of mechanical means of coal cutting? The remark is a significant one. The ostensible purpose of the Bill is for the absorption of labour; it is unquestionably one which will inure to its displacement. Those who profess themselves the friends of the miners are—unconsciously, perhaps,—assisting them in their own undoing. When the eight-hour day was introduced in gas-works, the cost of carbonizing work went up, according to Mr. H. E. Jones's computation, something like 33 per cent. Mechanical means of doing retort-house work followed; and now in carbonization for the production of gas three men are employed where (say) twelve were engaged before.

The Home Secretary does not seem to be convinced that the Bill will in any way increase the price of coal; and, in this and other of his points, he takes a generous view of human motives. Analyzing minutely his speech in reply to the deputation—and we say this with the greatest respect—the absence of reason for the Bill is conspicuous above all else. He confesses that it would be a serious thing if the calculation of a minimum increase of 11d. in the standing charges of the coal owners, and a minimum increase of 1s. 6d. in the cost of coal, were the issues of the measure; and that, if this should be the case, the speakers for the deputation had not over-rated the gravity of the matter to industry and to the public generally. It came as a surprise to him to hear that in coal tenders coal owners are already

inserting a condition that the price should be subject to an increase of 1s. 6d. per ton in the event of the Bill passing. As a man of affairs, the right honourable gentleman must know that it requires very little inducement to raise the price of commodities; and this Bill offers a very big inducement indeed. It is indisputable that an addition cannot be made to the expense of production of any kind without doing an incalculable harm to innumerable people—millions of whom are in less influential circumstances than the coal miners. The Bill can benefit no one; but it can injure many. The price of coal affects the cost of production of most manufactured goods. It is calculated by Sir George that a permanent 1s. 6d. increase or thereabouts, in the cost of coal would keep the price of gas 2d. higher than it otherwise would be. But we would point out that the 1s. 6d. would not cover the increased cost to gas manufacturers. If the cost of coal is augmented by 1s. 6d. per ton, iron and steel will go up in consequence by some 6s. per ton, and other manufactured goods required by gas undertakings will also advance, and so increase capital and revenue account charges. Besides, this is not a temporary but a permanent matter; and, therefore, it cannot be said that the 2d. increase is an exaggerated estimate of the imposition the Bill will cause upon the 6 million (or thereabouts) gas consumers of the United Kingdom—two-thirds in places, three-quarters in others, being of the working class. In the production of gas for this 6 millions of people (4 millions at least of whom are not of the affluent) some 15 million tons of coal per annum are used, giving an immense amount of employment in the coal-fields. The increase of 1s. 6d. per ton of coal would cause an increased payment for gas by these millions of consumers of at least 1¾ millions sterling; and gas is only one of the many necessary commodities that would be advanced in price. The permanent increase in the price of gas above the level existing under present conditions, Mr. Jones effectively pointed out to Mr. Gladstone, would do an inestimable harm to the working class and small industrial consumers, and expose the industries in which they labour to still fiercer competition from abroad. The further one penetrates this matter, the more serious it becomes, and the greater appear the reasons against sectional legislation that is detrimental to the whole. The Government professions include a jealousy for the maintenance of cheap supplies of all commodities for the poor. Hence their adherence to free trade; but here are the Government going headlong against their own principles in countenancing the throttling of free trade in labour.

If the present agitation has the salutary effect of influencing the dominant party in the House of Commons to consider this question not from the narrow point of view of party politics, but as a great national and economic question, we shall not fear for the result. But will they do it? Doubt is abroad. Nevertheless, let the gas companies throughout the kingdom follow up this deputation to the Home Secretary, by putting the matter before the members of Parliament in their areas of supply (see *ante*, p. 571); and the companies will at least have the satisfaction of knowing that they have not failed to do something to assist in the endeavour to bring about the destruction of this most pernicious measure.

Local Government Board and Artificial Illuminants.

It is announced that the President of the Local Government Board has authorized for the current year certain researches, under the grant voted by Parliament in aid of scientific investigations concerning the causes and processes of disease. One investigation is into the "injurious "gases evolved during artificial illumination;" and this inquiry has been entrusted to Dr. J. Wade, D.Sc. The terms of the inquiry are such that he has before him a very wide area upon which to work. Town gas, acetylene gas, electric lighting (through the flame arc), and oil must all be embraced. So far as the gas industry is concerned, the inquiry will be welcomed, and there will be no fear as to the result if the investigation is carried out with thoroughness; and we are confident that the Institution of Gas Engineers and the Metropolitan Gas Companies will be only too happy to place the whole of their resources at the command of Dr. Wade, in order to ensure that his conclusions in regard to illumination by modern gas methods do not suffer from any lack of conveniences and opportunity. Dr. Wade will not find any deficiency in literature and authentic testimony bearing upon the hygienic aspect of illumination by gas consumed in modern incandescent burners; and though he will, of course, pursue quite an independent course, the recent work on the subject cannot but be, for him as other workers, of suggestive value. Among published accounts of work in this direction of recent times, we have the evidence laid before the Board of Trade Committee presided over by Lord Rayleigh, the reports on the experiments made by Mr. Otto Hehner and Dr. Samuel Rideal for the South Metropolitan Company in 1904-5, the lecture by Professor Vivian B. Lewes before the Institution of Gas Engineers in June last, and the account of the researches by Dr. Rideal into "The Relative Hygienic Values of Gas "and Electric Lighting" which has just been published in "the Journal of the Royal Sanitary Institute," and a review of which is commenced in our columns to-day (p. 613). In this extensive and valuable inquiry, Dr. Rideal was assisted by Dr. Bertolacci, Mr. A. J. Martin, M.Inst.C.E., and his own staff. The inquiry comprehended medical, chemical, and physical considerations and observations; and the conclusions will be of considerable value in assisting to counteract the misconception and arrant misrepresentation of the would-be "sappers" of the gas industry. The final finding from the extensive work undertaken is that "the medical conclu-"sions are in accord with those arrived at from the chemical "and physical data, and also demonstrate that the choice "between the two systems of lighting does not depend "upon hygienic considerations."

Metropolitan Gas Companies' Accounts.

In another part of the "Journal" will be found the usual tabular statement of the accounts of the Metropolitan Gas Companies for the past year. It will be seen that the total capital, including premiums, engaged in the supply of gas in London on Dec. 31, 1907, amounted to £38,439,512; being an increase of £82,252. The South Metropolitan and Commercial Companies added £79,895 and £22,877 respectively to their capitals; but the Gaslight and Coke Company reduced theirs by £20,520. The total income was £6,788,076, and the expenditure £5,027,861; leaving a gross profit of £1,760,215—being at the rate of £4 11s. 7d. per cent. on capital, and £36 10s. 8d. per cent. on total gas-rental. The figures for 1906 were £4 6s. 5d. and £35 13s. 8d. The second table, giving the results of working out the items in the preceding one on the basis of each 1000 cubic feet of gas sold, shows that the Gaslight and Coke Company stand highest, and the South Metropolitan Company lowest, in the matter of capital outlay, income, expenditure, and gross profit. Taking the mean of the three Companies, the figures are: Capital, 20s. 4·56d.; income, 3s. 7·19d.; expenditure, 2s. 7·99d.; profit, 11·2d. Compared with 1906, there is a drop of 4·48d. in the capital, while there are increases of 2·65d., 2·21d., and 0·53d. respectively in the income, expenditure, and gross profit. The third table shows that there was an increase of £544,028 in the total revenue; no less than £333,375 of it being attributable to the largest Company. On the other hand, there was an increase of £440,602 in the expenditure, which reduced the profit to £103,426, compared with £142,494 in 1906. The item of £22,230, representing decreased expenditure on purifying materials and on labour in connection with their use, and those showing reductions to the extent of £38,136 in salaries and wages in the manufacturing and distributing departments, including wear and tear in the latter, are significant, as is also a drop of £8874 in rents, rates, and taxes. The heaviest item of increase is, of course, that relating to coal and oil, which stands at £339,638; the next highest is the additional £137,496 paid for the repair and renewal of meters and stoves.

The following table shows the carbonizing results of the three Companies, so far as they relate to the manufacture of gas from solid raw material only. Though, for the most part, they do not vary much from those for the preceding year, there is again a noteworthy increase in the mean make of gas per ton, which is 10,885 cubic feet, as compared with 10,811 and 10,539 cubic feet in the two preceding years.

Table *showing the Residuals Produced and the Gas Made per Ton of Coal by the Metropolitan Gas Companies in the Year* 1907.

Name of Company.	Coke.	Breeze.	Tar.	Am. Liq.	Gas.
	Cwt.	Bushels.	Gallons.	Gallons.	Cub. Ft.
Gaslight and Coke .	12·50	4·36	10·22	28·97	10,942
South Metropolitan .	12·39	4·95	9·54	38·34	10,762
Commercial	12·25	7·87	12·08	34·61	11,138
Mean per Ton . .	12·44	4·82	10·08	32·98	10,885

That One-Sixth Part!

THAT terribly momentous question for an over-exacting few in the gas industry, as to how the consumer of gas is to be assured, other than by automatic means, every particle of saving that may be effected by the use of the "Metropolitan" No. 2 test-burner, has found its way into the Committee-rooms of Parliament. It arose during the proceedings on the Gosport Gas Bill; and there was anything but an impressive questioning and answering on the matter by the Hon. J. D. Fitzgerald, K.C., and Mr. E. H. Stevenson, as counsel and witness respectively for the Council opposing the Company. The Committee saw so little in the point—the Company having accepted the sliding-scale, and offered a standard price of 3s. 6d.—that they ignored it altogether in their decision. The point is not referred to in our report of the proceedings elsewhere; but it will suffice to deal with it here. Mr. Stevenson submitted that the Company should only benefit to the extent allowed by the sliding-scale from the economies of production; we submit, too, that they should benefit from all that they can do in the development of the business by any method whatsoever.

In this Gosport case, by the action of the sliding-scale, the consumers will benefit to the extent of (say) five-sixths in all the economies and savings produced by improved manufacture, the exertions of the management, and the expansion of the business arising from good administration. But there is that fraction—that one-sixth part—of the value, such as it is, that is found in the new test-burner that a few wish to ensure shall not find its way into the pockets of the shareholders. The extreme triviality of the whole point makes the absurdity of it somewhat unique. "Straining "out the gnats and swallowing the camel" is about the position of those who desire to gain a little point over the sliding-scale companies in this matter, but are not prepared to show how they would protect the consumers (if protection is really required) supplied by those local authorities who either adopt the burner without as much as saying "by your "leave" or who obtain parliamentary sanction to its adoption, but whose regulating enactments provide no effective means of assuring that the consumers obtain their full pound of flesh other than by the automatic means that come into operation in all businesses—municipal or privately owned—subject to active competition.

But let us get back on to that poor one-sixth part of the small amount of economy that may or may not, according to working, be secured by the testing of illuminating power by the No. 2 burner. We have said, on recent occasions in dealing with this question (*ante*, pp. 405, 491), that in every way the consumer, by automatic means, will secure a full benefit in the case of sliding-scale companies from the adoption of the burner; and the more the matter is considered, the more convinced are we that this is so. Supposing—and there is much supposition about it, judging from experience in sliding-scale companies who have adopted the burner—one-sixth of the possible economy does go to the shareholder, that one-sixth will contribute in its degree to the increasing of the market value of his stock; and the increase in the market value of the stock ensures a larger premium on new issues, on which premium no dividend is paid, and so the consumer directly benefits from the shred of advantage to the shareholder. As sensible men, the Committee on the Gosport Bill saw the injury to the consumer has no reality—that it is purely a figment of the imagination, raised not from any sense of high moral conduct in these matters, but merely to have something, although insignificant, to talk about on behalf of municipal opponents to private enterprise. Where private enterprise has been captured by municipal authorities, there the new testing-burner can go on its way without let or hindrance.

The Heating Problem.

PERIODICALLY, we have the great smoke problem forced upon our attention by the sanitarists, who are opportunists of the most alive order. In the summer months, they "lie "low;" in the winter months, when the worst and the most oppressive atmospheric conditions prevail, and the smoke of factory and domestic chimneys adds to the general lugubriousness, then is their season. We suffered from fogs last winter; but bad as they were, worse have been known. They have given occasion for a fresh outburst on the part of the air sanitarists, such as there has not been since the booming of coalite preparatory to the issue of the Company's prospectus, and since, simultaneously, Mr. Paul Schlicht was among us from America, saying that, in the coke-ovens he had to introduce, the gas manufacturer had at command the most economic means of producing gas and at will a variety of fuel—from a hard coke to a less dense but smokeless kind—such as would suit both manufacturer and householder. We have not heard that the gas manufacturers of Great Britain have, from the best that Mr. Schlicht had to say, discovered anything in the system that he introduced to make it worth their while to depart from their presumably erroneous practices and accept the faith so strongly rooted in this genial coke-oven apostle.

But we are getting off the track. Smoke abolitionists during the past winter had an opportunity of having another turn. Thereby, they have not added much to knowledge; though their continued agitation would be of advantage to the gas industry if those of the old school of sanitarians were not so obstinately blind to progress, and persistently regarded any connection between the gas-fire and sanitation as a misalliance. It is more interesting to turn from their good intentions and occasional mistakes to a report that has been made by Mr. James Ollis, the chief officer of the London County Council, dealing with the question of smoke prevention. The authorities of the Metropolis who have jurisdiction in the matter of smoke nuisances had a rude shock lately in the failure of the Chelsea Borough Council in securing a conviction, and in having thrust on them a disconcerting bill of legal costs, over the emission of black smoke from the Chelsea generating-station of the Underground Electric Railway Company. The Public Control Committee of the County Council have since had the matter under consideration. Hence the report of Mr. Ollis, in which he recommends that the Council's powers in the matter of prevention should be broadened. That is not the side of the report, however, with which we have any close concern. There is another side to it, dealing more particularly with domestic heating, in connection with which we are pleased to see that no heroic measures are contemplated. There is a suggestion that the County Council should have power by bye-law, subject to the approval of the Home Office or the Local Government Board, to prohibit the adoption, in new or reconstructed premises or buildings, of any furnace or grate, or other fuel-consuming apparatus, which has been proved, to the satisfaction of the Council, to produce an unnecessary amount of smoke. Such power might be useful, but it is one too that might be employed arbitrarily; and, if there are no means of appeal on the part of makers, it is power that might be officiously and corruptly used at times. We emphasize "might be" so used; and this is said without any offensive intention, but merely to show the necessity of safeguards being applied. Another recommendation is that the Council shall have power to expend money for the purpose of promoting a knowledge of the principles of the combustion of fuel, furnace and grate construction, and stoking, and for encouraging the study of the scientific heating of houses or the use of smokeless fuels, with a view to the reduction of nuisance from the open fire grate. That is a suggestion which we can heartily commend, if the term "smokeless fuels" comprises the varieties produced by gas-works—gaseous and solid.

There we have a fear. The report almost ignores heating by means of gas-fires; and electricity, as is not surprising, is treated to still less consideration—cost and inefficiency (as cold weather has proved to many a poor deluded user of electric radiators) proving electricity to be anything but a suitable and trusty heating agent. True, the report states that cooking by gas, in place of the ordinary kitchener, has made headway in London, and that with cheaper gas it will no doubt become the rule. The optimism expressed in the last sentence is cheering. The claim can indeed be made by gas that it has done more than any other fuel in contributing to the relieving of the atmosphere of our towns and cities of its foreign burden of pernicious smoke. This being the case, strange it is that, in official reports dealing with the smoke problem, so little is made of gas as a public benefactor, and so sparing is the advice given to the public to confer further patronage upon it. As in other reports, so in this one by Mr. Ollis, much is said as to what is done in other countries. We are told of the New York system of burning hard and anthracite coal, of the use of central hot-air and hot-water heating systems, all of which are good enough in their way; but they have their disadvantages as well as their advantages. A central means of heating, with a house

distributing system, is rather costly to instal; and another drawback is that in a dwelling-house so heated one very soon experiences a feeling of stuffiness. Nor will a central heating system compensate the Britisher for the loss of his well-beloved open fire. The point is made in the report that central heating does away with those most uneconomical details in our daily life—the lighting and the cleaning entailed by separate fires. Now, instead of going abroad for illustrations of what is being done in heating, why not find out what gas undertakings are doing at home to encourage domestic heating by gas, which at once does away with labour, enables the regulation of heating at will, gives the Britisher the nearest approach to an open coal fire, and prevents smoke pollution. If the gas companies receive the necessary encouragement, they will no doubt be prepared to consider whether there is not something more that they can do to foster the freer application of gas for heating; and one way in which the London County Council can give the encouragement will be by not overlooking the claims of gas in anything they may do to promote knowledge of "the "scientific heating of houses or the use of smokeless fuels "with a view to the reduction of nuisance from the open-"fire grate."

Gas Supply in Australia.

During the past few weeks, the columns of the "JOURNAL" have recorded the progress made within the past six or twelve months, as the case may be, by a great number of gas companies in the United Kingdom; and the reports have been—with the single exception of the high price that has had to be paid for coal—of a wholly satisfactory character. In to-day's issue, we publish the proceedings at the recent meetings of two of the big Australian undertakings—the Australian Gaslight Company of Sydney, and the Metropolitan Gas Company of Melbourne—and as they may fairly be taken as being representative of the state of affairs on that side of the world, it may be said at once that the present position and future prospects of gas are as bright there as they have been shown to be here. Turning first to the Australian Gaslight Company, the Chairman (Mr. G. J. Cohen) had to record an increase in the consumption last year as compared with 1906 of 179 million cubic feet, or 9·2 per cent.; the quantity manufactured during the past twelve months having been 2287½ million cubic feet. The extension of the prepayment system, it is stated, has been responsible for a considerable portion of this increase. The number of consumers now exceeds 80,000; no fewer than 2900 having been added during the past six months. Gas-cooker sales grow satisfactorily—743 having been disposed of during the half year to Dec. 31, making the total number now supplied to consumers 15,919. Owing to this must be the gratifying fact that the consumption of gas during the daytime in the six months under review equalled 44·7 per cent. of the total make. As to the Metropolitan Gas Company of Melbourne, the Chairman (Mr. John Grice) pointed out that the quantity of gas sold last year was 1470 million cubic feet, as compared with 1342½ million feet in 1906, or an increase of no less than 9½ per cent. Going back a little farther, he mentioned that, after the crisis of 1893, the minimum sales were in 1898, when the quantity was 984 million feet. The sales last year were approximately 50 per cent. more than this; while in the same period the number of meters fixed has increased by 41 per cent. A significant feature of the accounts is the growing popularity of gas-stoves; the rate at which they are being adopted promising exceedingly well for this branch of the business. The number of meters fixed on Dec. 31, 1907, was 76,743; and at the same date the number of stoves on hire was 10,429 (which was an increase of 1486 over the previous year), and during the twelve months the department sold, on hire-purchase and outright, 2151 stoves—making a total addition during the year to the number of stoves in use of 3637. As there was also an increase of 1694 in 1906, it will be seen that the Company are making great strides in this direction. Constructional work is at the present time being undertaken by both Companies, so as to enable them to cope in the most advantageous manner possible with the continually increasing demands for gas.

Scottish Junior Gas Association (Western District).—The ordinary monthly meeting of the Association will be held in the West of Scotland Technical College next Saturday evening, at which two papers will be read—one entitled "Producer Gas," by Mr. F. Mellor, of Glasgow; and the other dealing with "Fire-Bricks and Retorts," by Mr. E. H. Stewart, of Bonnybridge.

NOTES FROM WESTMINSTER.

WORK has commenced in the Parliamentary Committee-Rooms; but not with any burst of enthusiasm. There are fewer Bills than ever to consider this session, and the schemes in the various classes are not, generally speaking, of great magnitude. When we remember sessions not long since when all the rooms of the well-known corridor on the right-hand side were occupied, and there were overflows on the other side of the entrance hall to the rooms, and when counsel, promoters, and witnesses—so many were there—rubbed shoulders in their passings to and fro in the corridor, the desertion of the last two or three sessions gives the scene of former great activity an almost melancholy appearance. Perhaps some will say it is a little early to write thus. But we are in the second week of March; and the sum total of interest found so far in our particular spheres have been a point of *locus* in the Court of Referees, a few matters in connection with the Gosport Bill, and a couple of comparatively small questions connected with water supply. One of these, associated with the Conway and Colwyn Bay water scheme, is not noticed in the following paragraphs—a decision not having been arrived at when the Committee rose at the end of last week. The greater part of the interest for us is concentrated in the group of Gas Bills referred to Mr. Whitbread's Committee, which group led off with the Gosport measure. The other Bills in it are the Bromley and Crays, the Derby, the Draycott, the Garw and Ogmore, and the Swinton and Mexbrough. The last-named is following Gosport; but the Draycott Gas Bill is the one which promises the most interesting fight. In connection with the Bromley Bill, the Crays people are taking advantage of the amalgamation of the two Companies to press for a drop to uniformity of price with Bromley at once, instead of stepping down by stages as proposed by the Bill. The request is a most unreasonable one, and, so far as we can remember, against all precedent where the conditions are such as exist in this instance. Moreover, to grant the desire of Crays would work an injury to Bromley. The Crays district is being liberally treated under the Bill; and the advantages for them in amalgamation are greater than for Bromley. Regrets frequently follow the over-reaching of opponents; and we hope for that result in this case. A Lords Committee will this week consider the Llanelly and Swansea Valley Gas Bills. After these are disposed of, there will again be almost blank periods for Gas Bills. There are plenty of water measures in prospect, but not of any importance in size of project.

Renewals Fund. It seems that the renewals fund is undergoing some revision at the hands of the Lord Chairman. There has been nothing divulged yet as to the nature of the intentions of his Lordship; but it is to be hoped that a provision of this nature that is fundamentally and economically sound, and is an aid to prudent finance, stands in no danger. The announcement that the Lord Chairman was giving attention to the subject, and was expected to shortly deliver a decision upon it, was made by the Hon. J. D. Fitzgerald during the evidence of Mr. Corbet Woodall on the Gosport Bill. In the case of this Bill, the parties did not discuss the clause; as there was agreement that, by the time the Bill reached the next House, his Lordship would have come to some determination in the matter, and would deal with the clause accordingly.

The Gosport Bill. The greater part of the discussion on the Gosport Gas Bill before Mr. Whitbread's Committee last week was on trifles; and there was much time wasted by the opponents. The District Council wanted—like local authorities often do when a Company is in Parliament—several unreasonable things. But they did not get a great deal beyond what the Company, by their Counsel and Mr. Corbet Woodall, were quite willing to concede. The Council ask for a compulsory purchase clause; but on what just ground deprivation of their property should be the lot of the Company, the Committee failed to make discovery from the evidence of either Mr. E. H. Stevenson or Mr. William Cash—the latter of whom was called to state the historical and present features of the Company's finance. The desire for a purchase clause has therefore ended in a rebuff. The promoters entered Parliament as a 4s. 6d. maximum price Company; but they had not much care whether they continued as such, or were allowed a sliding-scale with a standard price of 3s. 6d.—the charge for gas at the present time. Mr. Stevenson thought 3s. would be high enough. Of course, witnesses for local authorities opposing companies must think, but they do not always think of what is fair; and a 3s. standard in the circumstances of Gosport would have been altogether unfair. The Committee gave the 3s. 6d., but reduced the proposal, made by the Company's Counsel, of a standard dividend of 9 per cent. to 8½ per cent. The total capital powers that the Company sought amounted to £72,333; and the Committee reduced this to £50,000. The Company are one of those who are tied to a clause, invented and imposed before gas was considerably used for any other purpose than lighting, under which clause they are bound to supply the Local Authority with gas for public lighting at a price not above the lowest charged to any other consumer. The Company proposed to insert "for lighting purposes" after "consumer" in the provision, as has been done in other cases during recent sessions; but the Committee declined to allow the alteration. The Committee we cannot think took into full consideration the position of gas supply in 1865, when gas was used

pra tically for lighting purposes only, and now, when gas is used so largely for industrial and cooking and heating purposes. The ancient provision is distinctly a hampering one in the prosecution of modern business; and, in asking for the alteration, the Company were only suggesting that the conditions should be defined that prevailed when the clause was inserted in their Act of 1865. The Company naturally want to develop the day business; and the Committee did not, in our opinion, act wisely in the interests of all the consumers of gas in perpetuating a disadvantage that was not contemplated 43 years ago. The Company are adopting the new test-burner; and the Council desired to secure some advantage from this. The matter is dealt with elsewhere.

A Question of Competition. There was an important argument before the Court of Referees last Wednesday, with reference to the granting of *locus standi* to three Gas Companies against the Finchley Urban District Council Bill, under circumstances knowledge of which may henceforth be useful to other companies with authorities in charge of electric lighting undertakings, and seeking to obtain an undue advantage in competition. Such authorities have already considerably more liberty than gas companies in the manner of conducting their electricity business, which liberty establishes an inequality in competition. In this case, the Companies applying for *locus* were the Barnet Gas and Water Company, the Southgate and District Gas Company, and the North Middlesex Gas Company. They admitted, and admitted freely, that the proposals of the Council were not in themselves large, but they were important in that they would create a precedent of which the Council might take advantage hereafter to the serious detriment of the Gas Companies concerned. The statutory value of the "thin end of the wedge" cannot be over-estimated. The complaints or objections of the Barnet and Southgate Gas Companies were three in number. They objected to the Council going outside their administrative area to supply electricity; to the supply of electricity in undedicated streets, which would give the Council a distinct advantage in competition—both gas and electricity being at the present time under the same disability in this respect; and as ratepayers (in this the North Middlesex Gas Company joined) they resented any addition, through extended speculation, to the injury they already suffer from the loss on the electricity undertaking and through the heavy cost of public electric lighting. If the recently issued Board of Trade return is consulted, it will be seen that, during the last completed year of accounts for public lighting in the Finchley area, nearly as many units of electricity were consumed as for private lighting. The figures were: Public lighting, 238,000 units; private lighting, 298,708 units; power and heating, 165,506. Whereas, for lighting and heating, only 1·64d. per unit was charged, the private lighting consumers were called upon to pay 4·72d. per unit. However, though ratepayers in the Finchley district, the area of the North Middlesex Company is not affected by the Bill; and therefore they were refused *locus*. But the other two Companies secured what they sought; and the matter will now be watched to see how they fare in their contest with the Council before the Select Committee.

Electricity Supply for London. There is to be another big inquiry into the question of the supply of electricity in bulk and for power in the Metropolis. There have been inquiries enough into this matter; but again Bills have been introduced, and they must receive treatment. Peradventure, if fortune favours, we may see an end to this matter this year; but fortune is a fickle jade, and particularly so when there is a Government in power so favourable as the present one to municipalization, and so notoriously unfavourable to authorizing a company to deal with the electricity power and bulk supply in London, the protraction of the final settlement of which the Earl of Onslow describes as a "scandal." It was at the instance of his Lordship that one day last week the House of Lords decided to refer the London and District Electricity Supply Bill, the London Electric Supply Bill, and the London (Westminster and Kensington) Electric Supply Company's Bill to a Joint Committee of both Houses.

An Unfortunate Water Scheme. In the Parliamentary Committee rooms, misfortunes encountered in connection with water schemes are related session after session. The Stockport Corporation have a scheme, known as the Kinder, which has in its history been punctuated with difficulty. Sir Henry Kimber and his Committee last week heard the doleful tale; the Corporation being before them with a Bill which asked, *inter alia*, for authority to construct a temporary tramway between Hayfield and the Kinder reservoir, which was originally to be constructed by building a masonry embankment. The contract was given in 1902 to Mr. A. Kellett (afterwards converted to Kelletts Limited) for £249,000. The contractors constructed a tramway, and acquired certain quarries near the site. Subsequently certain defects were discovered in the strata on which the dam was to be constructed; and the contractors objected to proceed on account of the risk. Acting on the advice of Messrs. George H. Hill and Sons, the masonry dam was abandoned; and it was decided to erect an earthern embankment instead. The original contract was terminated; and in an action the contractors recovered £52,546, including £29,000 profit for the discarded masonry dam. The contractors, however, still retained the tramway commanding the approach to the reservoir; and negotiations with them either for acquisition or working rights ended abortively. Hence the present proposal in the Corporation Bill. Kelletts Limited opposed, on the ground that the proposed tramway would cross their line at four different points, and otherwise interfere with its use. The sympathy of the Committee was with the Corporation; and Sir Henry Kimber suggested a settlement. This was eventually arranged; and Kelletts Limited are to receive £4000 for the line, and a grant of running powers during the construction of the earthen dam for the working of the quarries. Kelletts, however, wanted a pre-emption for the acquisition of the line on the completion of the water-works; but this the Corporation could not concede, and the Committee upheld them. It is a pity that it required costly parliamentary intervention to arrive at this agreement.

GAS STOCK AND SHARE MARKET.

(For Stock and Share List, see p. 648.)

THE tide in the affairs of the Stock Exchange last week moved very irregularly. There were good and bad factors; and, as each in turn came to the top, so the markets flowed or ebbed for good or ill. The cheapening of money was a good factor; but the strange thing about it was the slight effect it had on prices. *Per contra*, the adverse decision of the Railway Commission flattened the Home Rail Market effectually; and towards the end came a small bolt from the blue in the form of the Kaiser's indiscreet letter. Business in general was quiet. On the opening day, Consols and the gilt-edged division were in good form; but the rest went poorly. The positions were reversed on Tuesday; general prices picking up a bit, while Consols eased. On Wednesday, an improvement in tone spread nearly all round, in view of a fair amount of buying in anticipation of a lower Bank rate. On Thursday the anticipation became a reality, and that improved the general tone. But Consols rather shrank—probably on sales to catch profits. Friday was dull on the Tweedmouth letter incident; and prices pretty well all round were lower. There was not much change on Saturday; movements for the most part being both slight and unimportant. In the Money Market, there was a good steady demand, and rates for short loans were firm. Discount was irregular, but easier on the whole. The Bank of England reduced its rate from 4 per cent. (fixed on Jan. 23) to 3½ per cent. It is just eighteen months since the rate was as low as this. The volume of business transacted in the Gas Market showed a very fair increase in the aggregate; but the bulk of it was in the two chief Metropolitan Companies. What few changes in quotation were made were in the upward direction, with the important exception of the premier Company, the ordinary stock of which receded a point. Transactions in this issue were very numerous, and ranged from 96⅞ to 95⅛. In the secured issues, the maximum was done steadily at 88; the preference ranged from 106¾ to 108; and the debenture was marked at 83½ and 84. South Metropolitan was active and firm, changing hands at 121 free to 122¼. Commercials were quiet; the 4 per cent. marking 107½ and 108, and the 3½ per cent. 102. In the Suburban and Provincial group, Brentford old was active at from 242¾ to 244, Tottenham "A" marked 120½ and 121, ditto "B" 101 and 101½, ditto debenture 100¾ and 101¼ (a rise of 1), and Wandsworth "B" 129½ and 130. The Continental Companies were very quiet. There were only three or four bargains in Imperial at from 179 to 179½. European fully-paid marked 23⅛; and ditto part-paid 16¾ and 17. Among the undertakings of the remoter world, Buenos Ayres was done at 13 1/16, ditto debenture at 93 free, Melbourne 5 per cent. at 102⅜, Oriental at 142½, Primitiva at 6¾, preference at 4 3/16 to 5 1/16, River Plate at 13⅝ to 13⅞, debenture at 93 to 93¾, San Paulo at from 13¼ to 13⅜.

The Mines (Eight Hours) Bill.—A letter, bearing the signatures (among others) of Sir George Livesey, as President of the Incorporated Association of London Waterside Manufacturers, Mr. W. Doig Gibb, as President of the Institution of Gas Engineers, and Mr. H. E. Jones, as Chairman of the Gas Companies' Protection Association, has been sent to the papers calling attention to the above-named Bill, and indicating the effect of its passing. The writers point out that if the Bill becomes law, a largely increased burden will be thrown on all the great industries in the country which depend for their existence and prosperity on coal, and every member of the public will not only have to pay more for his fuel, but for the other necessaries of life in the production of which it plays so important a part. They have thought it right, therefore, as representing some of the greatest industries of the country, to appeal to the public through the Press to oppose the passing of the Bill; and they further ask every elector to communicate at once with the member who represents him, and urge him to vote against its second reading. It has been decided to invite coal consumers and others in the London district to attend a public meeting at the Cannon Street Hotel next Tuesday afternoon, to record a protest against the Bill; and the hope is expressed that steps will be taken to call similar meetings throughout the country. All information for the purposes of such meetings will be gladly supplied by Mr. G. E. Raine, Sanctuary House, Tothill Street, Westminster.

ACCOUNTS OF THE METROPOLITAN GAS COMPANIES FOR THE YEAR 1907.

—	Gaslight and Coke.	South Metropolitan.	Commercial.	All the Companies.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Capital and borrowed money (including premium capital)	27,493,237 11 9	8,325,340 0 0	2,620,934 18 2	38,439,512 9 11
Income—viz.:				
Total gas-rental	3,126,726 6 2(a)	1,305,577 8 6(d)	385,987 5 10(f)	4,818,291 0 6
Rental of meters, fittings, and stoves	211,881 6 8(b)	128,638 6 8	45,849 3 6	386,368 16 10
Residual products	866,526 2 2	571,710 12 0	106,154 6 1	1,544,391 0 3
Miscellaneous, including old materials	25,059 0 2	12,982 3 4	984 4 9	39,025 8 3
Total income from all sources	4,230,192 15 2	2,018,908 10 6	538,975 0 2	6,788,076 5 10
Expenditure—viz.:				
Coal and oil, including carriage and dues	1,380,871 3 8	815,348 9 8	203,891 9 1	2,400,111 2 5
Purifying materials, including labour	41,653 5 9	24,774 19 5	3,513 9 8	69,941 14 10
Salaries and wages—manufacture	232,913 17 3	146,913 17 9	40,536 9 10	420,364 4 10
Wear and tear—manufacture	415,612 10 10	192,646 18 2	46,019 0 4	654,278 9 4
Rents, rates, and taxes	287,172 10 3	85,208 12 1	21,668 14 0	397,049 16 4
Salaries—management	16,873 19 11	7,268 2 6	2,378 6 10	26,520 9 3
Collectors' salaries and commission	46,566 3 10	29,326 9 10	7,978 17 0	83,871 10 8
Stationery, printing, and general charges	22,557 0 3	23,475 12 2	5,884 7 1	51,916 19 6
Directors and auditors	5,904 4 0	5,165 5 3	2,650 0 0	13,719 9 3
Salaries and wages, wear and tear—distribution	233,087 15 3	91,518 7 2	27,754 15 3	352,360 17 8
Repair and renewal of meters and stoves, &c.	257,416 0 7	110,245 3 11	37,008 10 7	404,669 15 1
Law and parliamentary charges	2,348 11 4	10,942 15 0	327 18 9	13,619 5 1
Bad debts and extraordinary expenses	68,809 2 6(c)	60,109 4 7(e)	10,519 1 3(g)	139,437 8 4
Total expenditure on revenue account	3,011,786 5 5	1,602,943 17 6	413,130 19 8	5,027,861 2 7
Gross profit	1,218,406 9 9	415,964 13 0	125,844 0 6	1,760,215 3 3
Do. per cent. on capital and borrowed money	4 8 8	4 19 11	4 16 1	4 11 7
Do. do. gas-rental	38 19 4	31 17 3	32 12 1	36 10 8

(a) Including £143,988 received for public lighting and gas supplied by contract. (b) Including £14,560 rental of ordinary meters. (c) Including annuities £49,632 and £3017 on workmen's compensation account. (d) Including £3',034 for public lighting. (e) Including £14,473 paid to pensions, &c., funds, and £40,590 under the co-partnership scheme. (f) Including £11,702 (less discounts and allowances) for public lighting, &c. (g) Including £5736 paid under the profit-sharing scheme.

TABLE *showing the Capital, Income, Expenditure, and Profit per* 1000 *Cubic Feet of Gas Sold in* 1907.

—	Gaslight and Coke.	South Metropolitan.	Commercial.	All the Companies.
	s. d.	s. d.	s. d.	s. d.
Capital and borrowed money	24 11·74	13 3·58	16 5·28	20 4·56
Income—viz.:				
Total gas-rental	2 10·09	2 1·02	2 5·05	2 6·65
Rental of meters, fittings, and stoves	2·31	2·46	3·45	2·46
Residual products	9·44	10·96	7·99	9·83
Miscellaneous, including old materials	0·27	0·25	0·08	0·25
Total income from all sources	3 10·11	3 2·69	3 4·57	3 7·19
Expenditure—viz.:				
Coal and oil, including carriage and dues	1 3·05	1 3·63	1 3·35	1 3·27
Purifying materials, including labour	0·45	0·48	0·26	0·45
Salaries and wages—manufacture	2·54	2·82	3·05	2·67
Wear and tear—manufacture	4·53	3·69	3·46	4·16
Rents, rates, and taxes	3·13	1·63	1·86	2·53
Salaries—management	0·18	0·14	0·18	0·17
Collectors' salaries and commission	0·52	0·56	0·61	0·53
Stationery, printing, and general charges	0·25	0·45	0·44	0·33
Directors and auditors	0·06	0·10	0·20	0·09
Salaries and wages, wear and tear—distribution	2·54	1·75	2·09	2·24
Repair and renewal of meters and stoves, &c.	2·80	2·11	2·79	2·57
Law and parliamentary charges	0·03	0·21	0·02	0·09
Bad debts and extraordinary expenses	0·75	1·15	0·79	0·89
Total expenditure on revenue account	2 8·83	2 6·72	2 7·10	2 7·99
Gross profit	1 1·28	7·97	9·47	11·20

TABLE *showing the Increase or Decrease in each Item during* 1907 *compared with* 1906.

—	Gaslight and Coke.		South Metropolitan.		Commercial.		All the Companies.	
	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.
	£	£	£	£	£	£	£	£
Capital and borrowed money	..	20,520	79,895	..	22,877	..	82,252	..
Income—viz.:								
Total gas-rental	64,796	..	96,092	..	14,396	..	175,284	..
Rental of meters, fittings, and stoves	136,582	..	5,796	..	4,201	..	146,579	..
Residual products	131,760	..	84,221	..	9,174	..	225,154	..
Miscellaneous, including old materials	237	..	..	3,498	271	..	..	2,989
Total income from all sources	333,375	..	182,611	..	28,042	..	544,028	..
Expenditure—viz.:								
Coal and oil, including carriage and dues	174,595	..	134,041	..	31,002	..	339,638	..
Purifying materials, including labour	..	21,050	..	680	..	500	..	22,230
Salaries and wages—manufacture	..	26,964	4,347	..	..	328	..	22,945
Wear and tear—manufacture	19,158	..	5,054	..	..	5,496	18,716	..
Rents, rates, and taxes	..	5,373	..	2,723	..	777	..	8,874
Salaries—management	1,436	..	352	..	19	..	1,807	..
Collectors' salaries and commission	1,177	..	1,250	..	791	..	3,218	..
Stationery, printing, and general charges	2,411	..	..	141	469	..	2,739	..
Directors and auditors	4	..	..	94	..	..	..	90
Salaries and wages, wear and tear—distribution	..	20,340	3,960	..	1,188	..	.	15,191
Repair and renewal of meters and stoves, &c.	119,503	..	15,004	..	2,989	..	137,496	..
Law and parliamentary charges	..	1,057	7,119	..	..	622	5,440	..
Bad debts and extraordinary expenses	2,557	..	..	1,980	301	..	878	..
Total expenditure on revenue account	246,057	..	165,509	..	29,036	..	440,602	..
Gross profit	87,318	..	17,102	..	..	994	103,426	..

THE RELATIVE HYGIENIC VALUES OF GAS AND ELECTRIC LIGHTING.

By Dr. Samuel Rideal, F.I.C.

The March number of the "Journal of the Royal Sanitary Institute" contains a paper, comprising 83 pages and several plates, on "The Relative Hygienic Values of Gas and Electric Lighting," by Samuel Rideal, D.Sc., F.I.C., who is a Fellow of the Institute. We propose to indicate in the sequel the purpose and scope of this interesting paper, and the conclusions at which the author has arrived.

The investigation undertaken had for its object the determination and comparison of the hygienic effects, direct and indirect, of gas and electricity in domestic lighting. The scheme followed involved the study of: (1) The direct physiological effect of each light, (2) the indirect effect of the atmospheric changes effected by the light, and (3) the nature of these changes. These three branches of the investigation were studied simultaneously; and subsequently some questions raised in the course of this work were investigated further in a series of control tests. Dr. Bertolacci carried out the necessary medical observations, and Mr. A. J. Martin, M.Inst.C.E., the physical determinations. For the physiological observations, 15 persons, mostly chemical or clerical assistants, were chosen as subjects. The average age of nine, who were utilized throughout, was 25·9 years, and their average weight was 9 stone 5·4 lbs.; while the remaining six, all clerks, who were only retained for the later observations, averaged 25¾ years, and 9 stone 12·8 lbs. The weights seem low for men in the prime of life; but it is stated that all the subjects proved on examination to be healthy, and "fair physiological examples of men living and working in London." Each took a meal from 30 to 45 minutes before attending, and avoided smoking or drinking while under observation.

The investigations were carried out in a room, which for most of them was divided into two by a wooden partition, situate in the basement of a five-storey block of offices in Victoria Street, Westminster. The division produced two rooms, each 16 ft. 4½ in. by 14 ft. 10 in., and 10 ft. 4 in. high, and having therefore a cubical content of about 2500 feet. Each had two windows, facing an area 8 feet wide and 7 ft. 8 in. deep, and having a south-east by south aspect. On the side of each room facing the windows was a door opening into a corridor, and in one room a window which was blocked out during the experiments by a close screen. There was a fire-place in the side of each room facing the wooden partition, and a ventilating opening, having a net area of 7 square inches, into the chimney in each. This ventilating opening was kept closed in most of the experiments. A baize door was hung outside each doorway, so as to provide an air-lock for ingress and egress, and a holland blind was kept drawn over each window. The fire-places were blocked by tightly-fitting screens. The walls were thick and solidly built of brickwork and cement. The flooring was of planks nailed to sleepers bedded in concrete; and the covering was felt, over linoleum.

The rooms had been distempered and whitewashed according to the landlord's ordinary practice shortly before the experiments commenced. About 50 lbs. of whiting had been used for the purpose; and this amount would be capable of fixing 16 lbs. of sulphur. If a consumption of 4 cubic feet of gas per hour sufficed for the lighting of the rooms, and the gas was assumed to contain 60 grains of sulphur per 100 cubic feet, it would take about 25 years for that 16 lbs. of sulphur to be evolved, and the basicity of the room to be thereby destroyed, if the lighting time averaged 5 hours per diem. A pendant fixed in the centre of each room was fitted with two "Darwin" bijou inverted incandescent gas-burners, each consuming on an average 1·28 cubic feet of gas per hour, and two "Royal Ediswan" electric glow lamps, each consuming about 94 watts per hour. Both gas and electric lamps were nominally of 25-candle power. They were disposed alternately in a circle 12 inches in diameter within a 25-inch diameter hoop, 4 inches deep, and supporting a silk flounce 12 inches deep, red outside and white inside.

The gas supplied by the Gaslight and Coke Company, at a price of 2s. 11d. per 1000 cubic feet, had, according to the official tests, a calorific power ranging from 582 B.Th.U. gross and 519 B.Th.U. net to 644 B.Th.U. gross and 578 B.Th.U. net, and averaging about 600 B.Th.U. gross and 540 B.Th.U. net. A cubic foot of the gas produced on combustion, on the average, 0·6 cubic foot of carbonic acid and 395 grains of water. The water production has been taken to be the amount condensed in the calorimeter, making allowance for that escaping as gas. [It is not stated, but presumably allowance was made for the moisture in the air entering the calorimeter in arriving at the water production.] The supply of current was at 200 volts pressure, and the ordinary price 5½d. per B.T.U. The evening gas pressure of 34-10ths was governed down to 19-10ths at the burners. The watts consumed and the heat generated by an electric glow lamp increase at a somewhat greater rate than the square of the voltage. The Westminster electricity supply "is said to be liable to vary from 197 to 205 volts"—a range of 4 per cent.; whereas the lamps used varied from 23 to 30½ in candle power, or by 30 per cent. The watts per candle ranged from 3·4 to 2·86. The gain in efficiency with increase in voltage is attended by a serious falling-off in the life of the lamp.

Tests were made with a Simmance-Abady flicker photometer of the illuminating effect, vertically downwards, and at angles of 60°, 45°, and 30° to the horizontal in the direction of each corner of the room, with each lamp with the flounce hanging behind it. The candle powers found at the different angles are shown in the diagrams, figs. 1 and 2. The mean hemispherical intensities

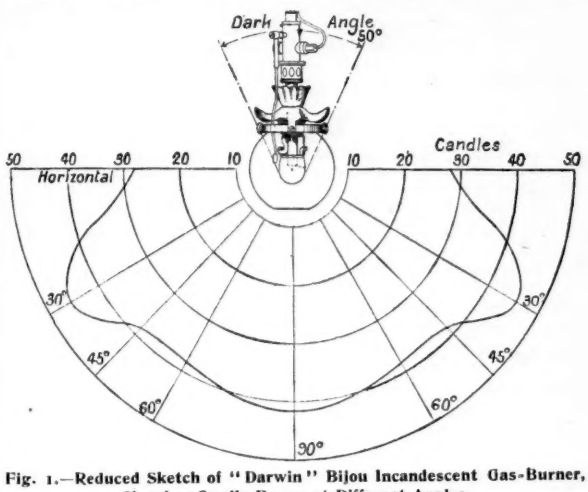


Fig. 1.—Reduced Sketch of "Darwin" Bijou Incandescent Gas-Burner, Showing Candle Power at Different Angles.

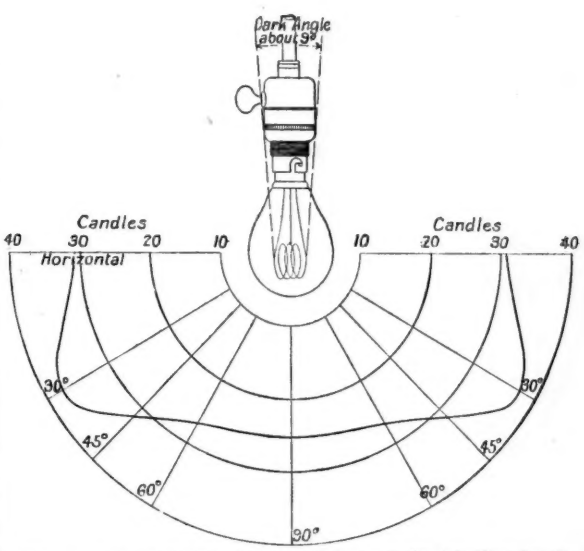


Fig. 2.—Reduced Sketch of "Royal Ediswan" Electric Glow Lamp, Showing Candle Power at Different Angles.

averaged 38·1 candles for the gas-burners, or 29·3 candles per cubic foot of gas consumed per hour, and 32·7 candles for the electric lamps, or 3·18 candles per kilowatt hour. There was a falling off in efficiency of the gas-burners of 13·3 per cent., and in that of the electric lamps of 14·5 per cent. [It is not, however, clear to what period these figures apply, and whether the number of burning-hours was the same for the two.] The results of a continuous run elsewhere of 603 hours of a similar mantle gas-burner showed a horizontal illuminating duty averaging 22·5 candles per cubic foot per hour for the first 400 hours, and falling to 20·1 candles at 603 hours. The horizontal illuminating power of the electric lamps used averaged at the close of the experiments 30·7 candles (showing a consumption of 3·06 watts per candle), while that of a similar new lamp averaged only 25·3 candles. The mean horizontal illuminating power of the gas-burners used (presumably likewise measured at the close of the experiments) was about 28 candles.

A table, 6 ft. by 3 ft. 6 in., stood in the middle of each room, with its top 3 ft. 7½ in. below the lamps; and the illumination afforded on it was found to range, in terms of candles-at-one-foot-distance, from 4·2 at the centre to 1·5 at the corners for the pair of electric lamps, and from 6·1 to about 2 for the pair of gas-lights. Thus the gas-burners gave the best illumination of the table, while the electric lamps gave the better general illumination of the room (compare figs. 1 and 2). Different shades to the latter would improve the table illumination by them.

When heating of the rooms was absolutely necessary, an electric heater of the dark type, consuming about one B.T.U. per hour, was employed in each room. Before and after each evening's work, the air supply of the room was measured. Readings were made every half hour of the temperature at various points, and of wet and dry bulb thermometers; and estimations were made at intervals of about a quarter-of-an-hour of the proportion of carbonic acid in the air, and from time to time of the organic matter and

carbonic oxide present. Bacteriological examinations of the air were also carried out. The meteorological conditions were recorded from the readings made in the vicinity for the Meteorological Office. The following summary of the results of the observations is given by the author:—

Room.	Illuminant.	No. of Runs.	Maximum No. of People.	Air Supply. Cubic Feet Per Hour.	Air Supply. Volumes Per 10 000.	Maximum Carbonic Acid.	Temperature in Degrees Fahr. Start.	Finish.	Change.	Percentage Humidity. Start.	Finish.	Change.
Undivided	Gas	22	8·4	3,525 (1)	30·1		53·6	57·0	+3·4	74·2	76·8	+2·6
				7,835 (2)	14·9							
,,	Electricity	19	8·4	3,355 (1)	23·0		54·0	57·2	+3·2	73·7	76·0	+2·3
				7,191 (2)	12·9							
Divided	Gas	15	7·5	2,045 (1)	37·2		60·9	64·0	+3·1	69·1	70·4	+1·3
				11,300 (2)	12·8							
,,	Electricity	15	7·5	1,961 (1)	29·9		60·5	63·3	+2·8	71·1	71·9	+0·8
				11,200 (2)	12·3							

(1) Under restricted ventilation—*i.e.*, fire-places and ventilators blocked.
(2) ,, natural ,, ,, ,, ,, ,, open.
(In some cases in the divided room the windows and doors were also open.)

Dr. Rideal next goes on to a more detailed discussion of various points involved in, or arising out of, the results given in the foregoing summary. He first refers to the causation of the hygienic effects of the two modes of lighting. In regard to heat produced, he observes that the net calorific value of the gas only is significant, because units of heat "expended in the vaporization of water are not recovered in the room." An estimate of Rubner's indicates that the net output of heat from a human being is about 340 B.Th.U. per hour. The experiments indicated that, under the prevailing conditions, a human being produced 0·8 cubic foot of carbonic acid per hour, and evaporated from the skin and lungs 700 grains of water. The following table shows the effects per hour of the lights and six men:—

—	Rate of Consumption.	Net Heat Evolved.	Moisture Produced.	Oxygen Consumed.	Carbonic Acid Produced.
		B.Th.U.	Grains.	Cub. Ft.	Cub. Ft.
Pair of gas-burners . .	2·56 c.ft.	1382	1012	3·07	1·54
,, ,, electric lamps .	188 watts	658	*Nil*	*Nil*	*Nil*
Six men.	—	2040	4200	6·00	4·80

It will be seen that six people effect much greater alterations in the air of a room than either illuminant.

The estimations of carbonic acid in the air of the rooms were made generally with Haldane's apparatus; but some check determinations were made by Hesse's modification of Pettenkofer's method. The author emphasizes the fact that carbonic acid in any proportion in which it would be likely to occur in the air of a dwelling room is not in itself injurious to health, and that only when it is produced by respiration does it acquire hygienic significance, because then it serves as an indicator of the presence of more or less offensive or harmful organic matter of respiratory origin. Carbonic acid estimations were used for determining the rate of change of the air of the room, or the ventilation. A large quantity of carbonic acid was first introduced from a cylinder of the liquefied gas into the air of the room, and, after thorough mixing, the proportion present was determined at short intervals. The fall shown in the proportion indicated the rate of change of the air. Subsequently the rate of air change was sometimes computed from the proportion of carbonic acid present and the quantity made, when gas had been burnt in the room until a steady state had been reached. The calculation of the ventilation was facilitated by plotting on semi-logarithmic paper. Notwithstanding the precautions taken to maintain uniform conditions in the room, wide variations in the ventilation were observed, and appeared to be independent of the direction or force of the wind.

(*To be continued.*)

Injurious Gases Evolved during Artificial Illumination.—Under the grant voted by Parliament in aid of scientific investigations concerning the causes and processes of disease, the President of the Local Government Board (the Right Hon. John Burns) has authorized "an investigation of the injurious gases evolved during artificial illumination," to be conducted by Dr. J. Wade, D.Sc.

Institution of Civil Engineers.—At the meeting of the Institution last Tuesday, it was announced that, in addition to Mr. F. C. Bancroft, B.Sc., of Hull, already notified, Mr. William Ingham, Water Engineer to the Port Elizabeth Corporation (formerly of Torquay), and Mr. George Lingwood, of the Barbados Water-Works, have been transferred from the class of associate members to that of members. As the result of the ordinary monthly ballot, Mr. Frank Livesey, B.A., of the Croydon Gas-Works, son of the late Mr. Frank Livesey, was admitted an associate member.

ELECTRICITY SUPPLY MEMORANDA.

The Excuses for Evading a Cost Trial—Voracious Incandescent Gas-Burners—A Test of Bare Illuminating Power Assertions—Dublin Finances—An Indirect Rate-in-Aid—Lighting of Public Institutions—Correct Principle v. Personal Ambition.

ALL the electrical papers will, we suppose, soon have had a turn at making excuse for electricians declining the Welsbach invitation to a public trial to prove the erroneousness of the much-advertised declaration that, with the metallic filament lamps, electricity is cheaper than gas. The excuses get weaker and weaker, as the difficulty grows of finding fresh ones. The "Electrical Times" has now had a kick at the challenge. On Mr. Laurence Fletcher's own basis of testing, "Meteor" says it is scarcely probable that the challenge will be taken up. "Meteor" it seems, has had a letter from West Ham (who has not had one from that quarter?) which he says shows one of the defects of Mr. Fletcher's conditions. Read this, and if the reader has any humour in him it will be tickled: "Apparently a very special 64-candle power mantle is to be chosen, for it is only to consume 2 to 3 cubic feet." It is a small matter, but it is the burner and not the mantle that will consume the gas." Obviously, it is a defect in the eyes of "Meteor" that a 64-candle power burner should "only consume 2 to 3 cubic feet," because he adds "another slight defect is that the gas mantles are to be renewable at pleasure, *so long as their cost be included*." What is there objectionable about that, "so long as their cost be included?" Does our meteoric *confrère* know the terms of the challenge? Here is one of them: "If the competition [with the Osram lamps] does not prove at the end of a year that light for light the Welsbach system, allowing for renewals at the current prices in both instances, comes out at *less than half the cost of the electrical installation*, then," &c. That is the point—the half cost price; so where is the defect even if the Welsbach Company choose to change the mantles every day, but they are not likely to be so wasteful, for the necessity of doing so does not arise. Then about the burner. Supposing the burner used is one that will give for 2 to 3 cubic feet of gas 64-candle power, the burner is one that is available to consumers, just as the metallic filament lamps are. It is the newest electric incandescent lamp that is challenged; and is it also a defect in the offer that this lamp only uses about 1·3 watts per candle power?

Then we go on, in "Meteor's" amusing excuse, to learn, and not for the first time through the electrical press, that "although the unhappy consumer knows that his candle power suddenly tumbles down a very steep portion of the curve on the third or fourth evening of use, he does not undergo the agony of changing mantles until the light is so abominable that he really cannot see to read." We are glad to see that the supposed precipitate retreat of the mantle from well-doing has increased from hours to evenings; it used to be hours. But there is one thing in which our electrical contemporaries who deal out plentifully from their imagination are consistent, and that is in exposing their ignorance of the physical properties of the incandescent mantle, and of the fact that, if a mantle has not become fractured, and the burner is periodically cleaned, there need be no appreciable diminution in the excellent efficiency obtainable per cubic foot of gas consumed. If the Welsbach Company can prove—as they can easily do—that they can give the consumer the means of obtaining an illumination equal to that to be realized by metallic filament lamps in lighting a house at *half the cost* of the latter, including all renewals, what is there to object to?

Mr. H. H. Holmes, Sales Manager of the West Ham Electricity Department, desires it to be widely known that "3½ cubic feet per hour from the so-called 64-candle power incandescent mantle is purely a theoretical one," for he has "never come across in practice burners taking less than 5 feet." This is an extract from a letter in the "Electrical Times;" something of the same kind was said by Mr. Holmes in the "JOURNAL" not long since. We asked him then to send us one of those undesirable and peculiarly extravagant incandescent burners for examination and testing; but he has overlooked—purposely no doubt—our very modest request. The energetic letter writer and electricity Sales Manager of West Ham has manifestly had a particularly narrow experience of incandescent gas-burners, or else he would know that 64 candles per 3½ cubic feet of gas is far from being a purely theoretical efficiency; there is—where excessively cheap and nasty burners are not used—an indisputable actuality about the figures, and about the statement that 25 candles is easily obtained by 1 to 1·2 cubic feet of gas (according to the quality of gas obtaining in a district) by the aid of the bijou inverted incandescent gas-burner.

But Mr. Holmes's principal object in writing his letter to the "Electrical Times" is to point out what it is costing certain West Ham consumers for illumination by the aid of the Osram lamp, in comparison with incandescent gas lighting. One consumer used to pay an average per week of 3s. 4¼d. (we are glad the farthing was not omitted, as that is evidence of an extreme accuracy and honesty) for the gas he consumed in his incandescent gas-burners. He now only pays 11¼d. per week for electricity using the Osram lamp. Two other cases are not so bad. Gas in one of these cost 1s. 2½d. per week; electricity 9d. In the other, gas cost 1s. 3d. per week; electricity 7½d. Mr. Holmes does not say anything about hours of use, and whether the houses throughout are correspondingly well lighted, or whether under electric

lighting, the family in each instance herd in one room the whole of the lighting hours, whether the maid is sent to bed at nine o'clock to effect economy—the rest of the house excepting the dining room and hall being in darkness—whether the hall light is turned on a quarter of an hour after and turned out a quarter of an hour before the single light in the dining-room, or whether 10 per cent. has been deducted for holidays and evenings when good-natured friends entertain the family. He tells us nothing of these things, as he did in the letter to the "JOURNAL" for Feb. 11; but, with a magnificent faith that we cannot help admiring, Mr. Holmes says "there can be no doubt whatever that these consumers are obtaining a better light with electricity than they did with gas." Surely in an industry that boasts of its scientific exactitude in all things except in the matters of trading and competition, such loose statements as this (even when backed by the exaggerations and badinage of "Meteor") cannot be accepted unsupported by a little more concrete proof. Just look at this. The man who formerly spent 3s. 4½d. on gas per week could buy 1220 cubic feet of gas in West Ham at 2s. 9d. per 1000 cubic feet. If we take Mr. Swinburne's 18 candles per cubic foot per hour basis of calculation, then $1220 \times 18 = 21{,}960$ candles. The 11½d. spent on electricity per week would buy at 3d. per unit $3\frac{3}{4}$ units.; and if we assume that a metallic filament lamp has an efficiency of 1 candle per watt per hour (it has not), the $3\frac{3}{4}$ units would only represent 3750 candles. What has been done by the consumer with the difference of 18,210 candles? Take the instance where 1s. 2½d. was spent on gas; and 30 cubic feet as being purchasable, at 2s. 9d. per 1000 cubic feet, for 1d. The householder in that case could buy 435 cubic feet of gas in the week. $435 \times 18 = 7830$ candles. The 9d. spent on electricity would buy at 3d. per unit 3 units. Again giving the Osram lamp the great advantage of assuming 1-candle power per watt, the 3 units would represent 3000 candles. To get to equal illumination, the efficiency of the incandescent gas-burners in this latter case would have to come down to $6\frac{3}{4}$ candles per cubic foot of gas consumed. And in the first case to 3 candles per foot of gas consumed, which is about the efficiency of the old flat-flame gas-burner! Now we ask any sane man (except "Meteor" and officials of the West Ham Electric Department) who understands this subject whether this simple calculation alone is not sufficient to cast the gravest suspicion on Mr. Holmes's assertions as to equality of illuminating power under the old and the new conditions. Of course, Mr. Holmes's figures apply only to places where the low-voltage metallic filament lamps can be used singly, and not in pairs, and where transformers with their additions to costs are brought into use. Why do not the West Ham Electricity Department pluck up courage, and offer to accept the Welsbach challenge? Their hesitation is incomprehensible. Just think of the condition. Equal illumination at half the cost of electric lighting! Mr. Seabrook and his faithful Sales Manager produce instances of, so it is asserted, electricity being cheaper than gas, light for light. See the margin they have between their illustrations and the condition in the offer with which to safeguard themselves. Yet they refrain. We have done our best to spur them into a more heroic frame of mind, but we have to admit to failure.

Great was the jubilation in the Dublin Corporation when, on a day now many months ago, the Chairman of the Electric Lighting Committee made the joyful announcement that, after several years of financial tribulation, the concern had "turned the corner." A correspondent of the "Irish Times," writing under the pseudonym "Pro Bono Publico," has exploded the comfortable fallacy that things are now well with the electrical undertaking, and has thrown light on how the concern is heavily subsidized by the rates through the public lighting. The accounts for the year ending March 31, 1907, have only lately been published; and what do they show? That sales of electricity to private consumers, with meter-rents, produced £30,597, that the civic buildings paid £1261 for electricity, and the public lighting £10,736. With a few odd additional pounds, the revenue totalled to £42,605. In other words, one-fourth of the whole income is paid by the Public Lighting Committee to the electricity undertaking. The expenditure, including £1913 maintenance costs of the public arc lamps, and payment of interest and instalment on loans, amounted to £44,325; so that there was an excess of expenditure over receipts of £1720. For the 487 arc lamps in use in the streets £22 per lamp was paid; and this does not include the capital charges. These figures require no elaboration to show how the ratepayers are being imposed upon in support of the electricity concern. Dublin is not an isolated sinner. The same unsparing critic of the concern presents other figures showing that the undertaking has £58,407 of dead capital hanging over it; and that the total capital outlay is £491,172, excluding any portion of the £70,000 paid by the Corporation for the Pigeon House Fort, the major and best portion of which is occupied by the new electric generating station, while the whole cost has been charged against the main drainage account. And corporations complain because we assert that in many cases other departments of civic work suffer for the electricity undertaking!

It has frequently come under observation that estimates very favourable to electricity are put forward for the lighting of public institutions when the electricity supply is a municipal concern; but when the actual costs—capital and running—are known by experience, they are discreetly curtained off from the public gaze. The men who are elected to be the wardens of the public purse misconstrue their duty. A mistaken notion is that, just because a municipality have an electricity undertaking under their management, other departments should, at the expense of the ratepayers, be compelled to patronize the electricity undertaking, even though something cheaper and more efficient offers. Specimens of impolitic mismanagers are to be found sitting as the North Dublin Board of Guardians. The Alliance and Dublin Consumers' Gas Company have offered to light the Union for an annual charge of £595 (inclusive of maintenance). The Company have also offered to fit up improved lighting arrangements for £125. The Corporation have submitted an estimate of £1250 for fitting up the premises for electricity—£1125 more than the Gas Company's tender. Then the "estimate" of the annual expenses for electricity is £639, but there are figures which indicate that the annual cost is more likely to be £825. In public institutions of this kind, the question of heating is very important; and gas in this work has a distinct advantage and material money value. This is a matter that is often lost sight of. Now from a business and economic point of view which figures—the gas or the electrical—are more advantageous in the interests of the ratepayers? There is a danger, if the North Dublin Guardians are not directed by the ratepayers to a proper sense of their duty, that the more expensive system of lighting will be adopted; and the ratepayers will be called upon to pay more year after year—not for one year only—than is necessary. The queer reasoning of Alderman Healy and Mr. Lynch as to why the ratepayers should do this is that the electricity undertaking is a "ratepayers' institution," and therefore should be supported by them. We submit for the consideration of the North Dublin Guardians and all other authorities who are swayed by the same mistaken notion that an institution of far greater importance to the ratepayers is a system of management of affairs that combines economy with efficiency.

The affairs of the Hanley Corporation electricity department have lately been under investigation by Mr. H. Ross Hooper, on behalf of the Local Government Board, in connection with the application for a new loan; and there is one point in the proceedings which shows how sound finance is subordinated to personal ambition. As he has done before, knowing well the frailty of electricity meters and testing instruments, and their short life, Mr. Hooper counselled their provision out of revenue. But this is how the Borough Electrical Engineer (Mr. Yeaman) regards the matter. He agrees entirely with the principle of charging all small items to revenue; but these "make a large annual sum, and an undertaking adopting this virtuous policy suffers in its cost-sheet in comparison with one not doing so, unless all such charges are made to a depreciation or reserve fund." Personal ambition has a lot to answer for in the framing of municipal policy; and here is an instance. The dread of unfavourable comparison induces Mr. Yeaman to perpetuate something that does not accord with what he agrees to be entirely right in principle. Well, well! there are singular people in the world.

"ELECTRICIAN" DIRECTORY AND HANDBOOK.

WE have received from the publisher (Mr. George Tucker) the twenty-sixth annual edition of "The 'Electrician' Electrical Trades' Directory and Handbook"—familiarly known as "The Big Blue Book"—which has recently been issued. The contents include notes of the year's progress in electric lamp improvements, and in electric power and the application of electric driving to industrial works, &c. A complete summary is given of the parliamentary work of the past year, so far as it affected the electrical industry. The law of electric lighting, power, traction, &c., is fully dealt with, and a digest, specially prepared by Mr. A. C. Curtis-Hayward, A.I.E.E., is given. The principal legal decisions of the High Courts last year are noticed. The subjects of patent law and expiring patents, rules for the installation of electric light, power, and traction in this country, the fire-risk rules of all the leading fire offices, as well as those which govern electrical installations in the United States, in Continental countries, and in the British Colonies, are included in the volume. Full financial details relating to electrical joint-stock enterprise, and information on the financial side of the electrical industry, will be found, including a directory of directors of electrical companies, particulars of the capital authorized and issued, the last dividends paid, the latest Stock Exchange quotations, all the principal officials, &c. The Directory Division contains the name and address of every person engaged in the electrical profession and industry throughout the United Kingdom, their telephone numbers, and their telegraphic addresses; a separate list of the latter (alphabetically arranged) being included. The Biographical Division furnishes original sketches of the careers of the leaders of electrical engineering enterprise at home and abroad, and contains a complete obituary for 1907 and other information. A valuable feature is a graphic survey of the engineering and electrical equipment of all the electricity supply and electric power and traction undertakings of the kingdom, given in the form of a number of compact tables, one of which is devoted to Colonial and Foreign undertakings of the same character. There are upwards of 2000 pages in the book, and the contents have all undergone careful revision up to the date of publication. The "Directory" has always occupied a high place as a book of reference in connection with the electrical industry; and the edition under notice furnishes evidence of the Editor's continued efforts to render it worthy of the position it has attained. It is published [at 15s.] by "The Electrician" Publishing Company, Salisbury Court, E.C.

PERSONAL.

Mr. W. M. Downie, who has been appointed Manager and Secretary of the Omagh Urban District Council Gas-Works, was for five years under Mr. Brodie, who has gone to Lisburn.

Mr. John Boraston, J.P., of Beckenham, has been appointed to fill the vacancy on the Board of the South Suburban Gas Company—caused by the retirement by rotation of Mr. C. Lea Wilson, who was not re-elected at the recent shareholders' meeting.

Mr. Arthur Newton, who, as mentioned last week, has been appointed Comptroller of the Metropolitan Water Board, in succession to the late Mr. F. E. Harris, was formerly Accountant to the Southwark and Vauxhall Water Company. In October, 1904, Mr. Harris recommended him as Deputy-Comptroller of the Board; and in that capacity he shared in the work of consolidating and unifying the various systems of accounts of the Water Companies, and in all the necessary schemes of organization of the financial department of the Board which have since been carried into effect. His promotion appears to have given satisfaction to the officers and staff generally, as immediately after his appointment had been confirmed by the Board he was presented with an illuminated address signed by upwards of 360 members of the staff of his department.

OBITUARY.

As announced at the annual meeting on the 29th ult., the Manchester District Institution of Gas Engineers have lost one of their members in the person of Mr. Henry J. Robinson, who for nine years had been Engineer, Manager, and Secretary of the Mossley Corporation Gas-Works. Deceased was formerly Assistant Gas Engineer at Stockport, in which town he began his career in the Borough Surveyor's Department, going subsequently into the gas-works. He had been in ill-health for some time; but he was confined to his house for only a few days. He was 43 years of age, and he leaves a widow and three children.

The death occurred recently, in his 66th year, of Alderman Wade, who for two years was Mayor of Halifax. Deceased was Chairman of the Water Committee of the Corporation during one of the most important periods in the history of the undertaking. It was while he was at the head of the department that the Walshaw Dean reservoirs, recently completed, were planned and commenced; and he made himself master of the smallest details of the enterprise. On his election as Mayor, he relinquished the chairmanship of the Committee; and his interest in the water-works necessarily became less active than formerly. Soon after the expiration of his term of office as Mayor, he practically abandoned municipal work, and attended but few meetings of either the Council or the Committee. Alderman Wade was known in a far larger sphere than that in which he laboured, as he was the inventor of the "Arab" printing machine.

We regret to record the death, at an advanced age, of Mr. Charles Gott, M.Inst.C.E., who for upwards of half-a-century had been identified, in one capacity or another, with the public and professional life of Bradford, of which town he was appointed Deputy Borough Surveyor in 1855. The next year, on the resignation of the Surveyor, he was promoted to the vacant position; and as the Corporation had just acquired the undertaking of the Bradford Water Company, he was appointed Water-Works Engineer. In augmentation of the newly-acquired scheme of water supply, he designed and carried out a number of works, including the Doe Park, Stubden, Leeming, Leeshaw, Horton Bank, and Brayshaw reservoirs. One of the most difficult of his professional duties was the successful reconstruction of the Lower Barden reservoir, which had not proved water-tight. Mr. Gott's work was many-sided, for there were attached to the office of Borough Surveyor at that time widely-varying duties now performed by special officials, including those of Inspector of Nuisances and Chief Officer of the Fire Brigade. He continued with the Corporation till 1875, when he left to devote the whole of his time to private practice, which soon became very large. He had wide experience in connection with arbitrations, alike as umpire, arbitrator, and expert witness; holding, indeed, in these capacities, a foremost place in the North of England. His services were regularly retained by the Corporations of Bradford, Leeds, Liverpool, Halifax, Harrogate, Scarborough, and other towns. He was a member of the Institution of Civil Engineers (which he joined in 1863), a Fellow of the Surveyors' Institution, and a Past-President of the Yorkshire and North of England Land Agents and Surveyors' Association and of the Bradford Society of Architects and Surveyors. In the Masonic world he was particularly well known; and the Lodge of Hope, of which he was twice W.M., has by his death lost one of its oldest members. He leaves a widow, two sons (who were in partnership with him), and three daughters. The funeral took place last Friday, at Scholemoor Cemetery, Bradford, and was attended by a large number of the private and professional friends of the deceased.

At the recent annual meeting of the Institute of Chemistry, Dr. Percy F. Frankland, F.R.S., was again elected President.

THE NEW GAS-WORKS AT WOLSTANTON.

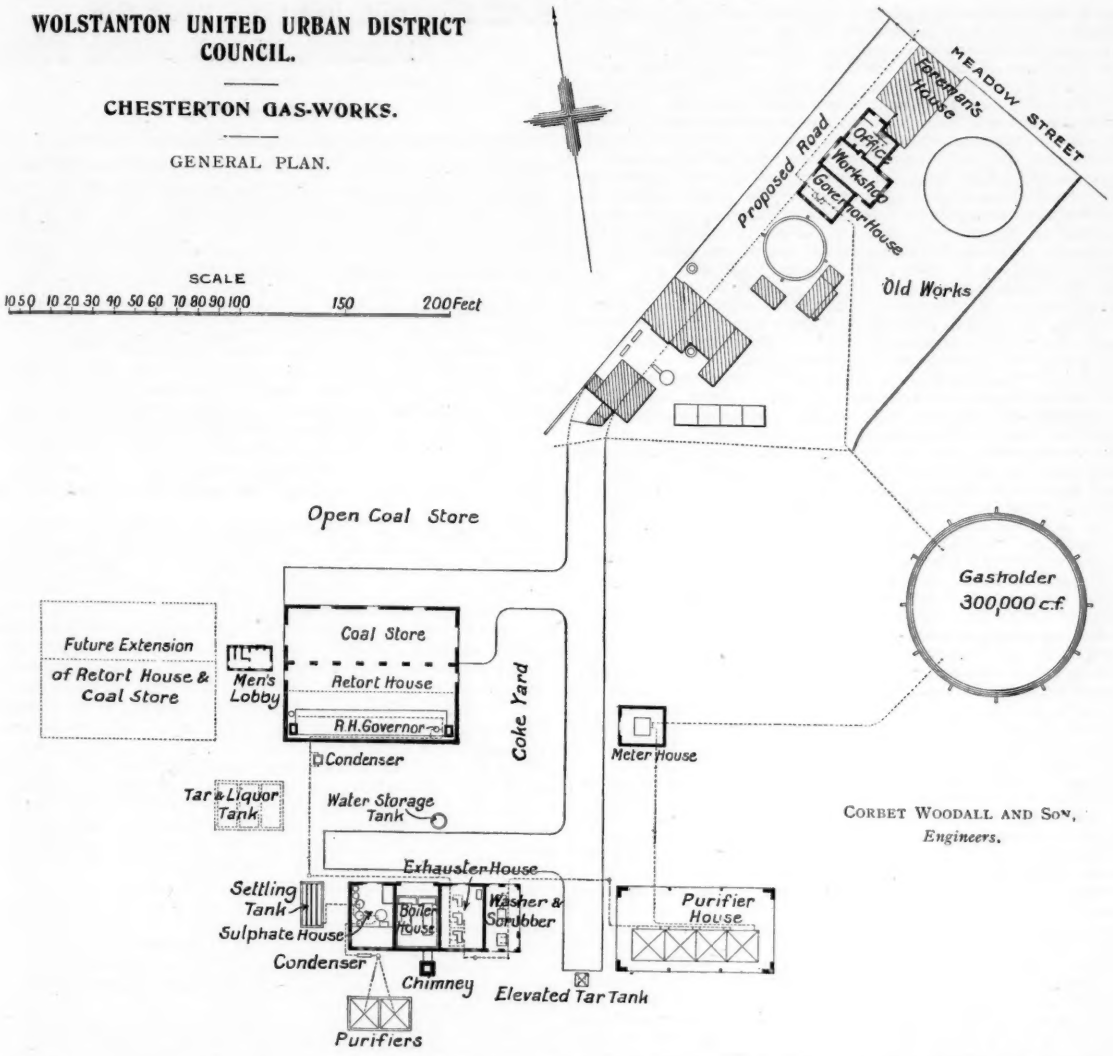
The Wolstanton Urban District Council deserve, if only as a reward for the tenacious fight they made for full statutory gas-supply powers and rights in their district, an abundant success in their new venture; and from the evidence that we have gathered such success is assured them. The area they are supplying measures some nine square miles; and a portion of the area was formerly in the gas-supply occupation of the Burslem and the Newcastle-under-Lyme Corporations, both of whom were —and naturally—loth to give up these points of their areas without some consideration in the way of compensation beyond the value of the distribution plant. But it will be remembered that Wolstanton made their claim to enter into possession of these areas simply by purchasing the distributing plant under clauses deliberately put into old Acts of the Corporations, and the existence of which clauses allowed the Corporations only a provisional tenure. The Corporations disputed the correctness of any such interpretation of the clauses; but Parliament upheld Wolstanton, and another success was subsequently scored off Burslem in the Law Courts.

It was a stubborn fight that was seen over this matter in the parliamentary session of 1906, and again in the arbitration proceedings last year. Such fights mean money; and Wolstanton has to bear an expense incurred in securing their Act of £2845, and the costs in the arbitration proceedings are estimated at about £3500. Then the District Council bought the Chesterton Gas-Works for £2600; and new works have been erected with a capacity of 60 millions, and so designed that the productive capacity can be supplemented readily, and at a comparatively low cost. With the expenses incurred in establishing their rights and in putting themselves into a sound position as gas suppliers, the Council spent £49,882, and have in possession works (with the Chesterton station) equal to 70 million cubic feet and a very promising area in which to do business. The area is of a rapidly developing nature; and, as a matter of fact, it is of more importance from the gas business point of view than was calculated at the time of the parliamentary proceedings. Truly, when one looks into the question of the character of the district as a whole, the reluctance of Burslem and Newcastle-under-Lyme to relinquish without a struggle even parts of the district can be appreciated. Looking round the area, one is struck by its feature as a residential district. There are really some good class houses in it; and some may even be described as fine ones. It is about as good a part as can be found in the Potteries for residential purposes. It is stated that there are in the supply district some 5000 houses, but at present only 2944 consumers, among whom are only 841 gas-cookers; so that the Manager of the Council's new undertaking (Mr. A. A. T. Botteley) has an excellent field before him on which to exercise his ingenuity in cultivating business.

The new works have been finished; and last Thursday, the Chairman of the District Council (Mr. Charles H. Bowers) and the Chairman of the Gas Committee (Mr. J. H. Woolliscroft) gathered round them their colleagues and a number of friends (including Mr. Henry Woodall, of Messrs. Corbet Woodall and Son, MM.Inst.C.E., from whose designs and under whose supervision the works have been constructed) to celebrate the completion of all that was necessary to be done to enable the Council to enter into business in the whole of their area on the coupling-up of the pipes of the parts taken over from Burslem and Newcastle-under-Lyme. The inauguration of the new works was regarded, as it is in fact, an important event in the history of the Council and the district. Before noticing the proceedings, we may take a glance at the plant and its general arrangement. It should be prefaced that, when the Council went to Parliament for authority to supply gas within their whole area, it was thought that a new works capable of producing 50 million cubic feet per annum would be sufficient for the purpose. However, it transpired during the proceedings which led to the transfer of the Burslem and Newcastle mains to the Council that a 60-million works would be necessary; and accordingly the new works have been designed and built to provide for this output. The old Chesterton Gas-Works, with the additions made to carry them through the two past winters, are equal to 10 million cubic feet. The works now in possession of the Council have therefore a total capacity of 70 million cubic feet per annum. Owing to the growth of the district, it is anticipated that the margin of producing plant will last but a short time; and then a further retort-house will have to be built. Until these further extensions are made, the old works will be kept as a stand-by, although they will only be used during the heavy winter period.

The site upon which the new works are built adjoins the old Chesterton works, and is about 3 acres in extent; and, as already intimated, the new works have been so arranged that extensions needed by the increase in business can be simply and cheaply carried out. The plan will show the general disposition of the plant. The buildings consist of a retort-house, with coal-store adjoining, buildings for the exhausters, boilers, washer and washer-scrubber, sulphate-house, offices, stores, and governor-house, men's mess-room, purifier-shed, tar and liquor tanks, water well, &c. The contractor for the buildings was Mr. John Gallimore, of Newcastle-under-Lyme.

Looking into the retort-house, it is found that the retort-bench



consists of seven regenerative settings, containing 48 retorts; the bench being arranged on modern principles, with tar column and Cowan retort-house governor. Three of the arches contain eight retorts each, and four six retorts. The reason for this variation is, of course, for ease of lighting up and letting down according to requirements. The retort-bench work was carried out, from the Engineers' designs, by Messrs. Winstanley and Co., of King's Norton. The remaining plant is of the ordinary type. The condenser is of the water-tube form, and was supplied by Messrs. W. C. Holmes and Co. The rotary exhausters are in duplicate, and were made by the Bryan Donkin Company, Limited, of Chesterfield. The tar-washer was supplied by Messrs. Willey and Co., Limited; and the rotary washer-scrubber by Messrs. Clapham Bros., Limited. The boilers (which are of the Cornish type, and fitted with Wilton's patent furnaces for burning breeze) are in duplicate, and were supplied by Messrs. Thomas Beeley and Son, Limited. The purifiers (four in number) are of the luteless form, and are fitted with "Standard" grids, and Milbourne's patent valves—supplied by Messrs. Edward Cockey and Sons, Limited, of Frome. The gasholder is built with three lifts; the capacity being 300,000 cubic feet. Messrs. Newton, Chambers, and Co., Limited, were the contractors for this. The station meter and district governors (which are 6-inch and 12-inch respectively) were supplied by Messrs. Parkinson and W. & B. Cowan, Limited. The smaller governor is for the supply of Chesterton, and the larger one for Wolstanton and Silverdale. The illuminating power of the gas to be supplied is 14 candles; and the photometer and apparatus for testing the quality have been supplied by Messrs. Alex. Wright and Co., Limited, of Westminster. The sulphate of ammonia plant is being made by Messrs. W. C. Holmes and Co.; and this is the only portion of the plant not yet in use. It will, however, be ready in ample time, as a good supply of ammonical liquor is needed before the plant can be put into effective use.

This, with the plan, is a sufficient general description of the works, which are well arranged, and built in the excellent manner for which the firms engaged have established reputations.

The Inaugural Ceremony.

The works described in the preceding article were formally opened, in the presence of a large gathering, last Thursday afternoon. Before referring to the proceedings, it may be mentioned that the Wolstanton District Council came into existence in 1904, as the result of the federation of the three parishes of Wolstanton, Chesterton, and Silverdale, which have a population of about 27,000. The bulk of the district had been previously supplied with gas by two neighbouring authorities; and in 1906 the Wolstanton Council (as explained above) obtained parliamentary powers to carry out the lighting of their own district. The Council have recently decided to charge a net price of 2s. 10d. per 1000 cubic feet for gas – the amount charged by several old-established undertakings in the district. They estimated that £4394 would be required to repay principal and interest; the loans being for a period of thirty years. Law charges amounting to £2845 have to be repaid in five years; making an annual charge for this period of £650, which is equal to 3d. per 1000 cubic feet of gas made. It is therefore felt that the Council have been able to commence working at an exceptionally low figure, and that as the principal loan and law charges are gradually paid off, the district will reap the advantage of an extremely cheap supply of gas.

The opening ceremony was performed by Mr. C. H. Bowers, the Chairman of the Council, and Mr. J. H. Woolliscroft, the Chairman of the Gas Committee, both of whom have taken a prominent part in the scheme which has just been completed. Mr. Donkin, on behalf of the Contractors, presented Mr. Woolliscroft with a silver key with which to turn the valve in the meter-house to admit the gas to the holder; and subsequently another key was handed to Mr. Bowers with which to open the valve in the governor-house and allow gas to pass into the mains. In performing this operation, Mr. Bowers expressed the hope that the undertaking they were inaugurating would be a financial success. The Chairman subsequently entertained the members of the Council and a number of other public gentlemen at luncheon in the Council Schools close by.

In proposing "Success to the Gas-Works," Mr. J. E. Brittain said he had to ask the company to drink success not merely to some individual or some local governing body, but to an undertaking which for years to come must be closely connected with the welfare and prosperity of the district. They had had gas-works in Chesterton ever since he could remember; but they had had no light in their streets, and very little in their houses. Now they were not only going to have light for themselves, in plenty and cheaper than before, but Chesterton, which had been in darkness for so long, was actually to become the centre and source of light for the whole district. He was sure those in Wolstanton who were called upon to pay 3d. or 4d. more for their gas would do so with pleasure, remembering that this scheme was contributing to the welfare and prosperity of the whole district, and that they were laying up solid and permanent advantages for those who came after. As an outsider, he had been delighted to observe the united way in which the Council had worked together. He congratulated them on the opening of the new gas-works, because every member had shown the greatest

courage in the face of serious adverse criticism; and also on what he considered to be the very satisfactory outlook for the future. They had a growing district; a very competent Manager in Mr. Botteley; while as Chairman of the Gas Committee they had a gentleman who, though new to the work, certainly accomplished it as if "to the manner born." Presiding over the Council they had a gentleman respected by everybody, and acknowledged to be a man of exceptional business ability; and they were fortunate in having such an expert adviser as Mr. Corbet Woodall, who had been of immense service to the Council.

In acknowledging the toast, the Chairman of the Gas Committee said they were commencing business under very favourable conditions, so far as the price per million cubic feet they were paying for their works was concerned. They were handicapped, however, through coal being at a high rate. He was glad to say that at the present time it had a tendency to go down in price. Just now they had only 3000 consumers. But Chesterton was a growing place, practically untouched; and Wolstanton was a rising residential area, second to none in North Staffordshire. In Silverdale and Knutton there were a large number of ratepayers who were not consumers, and he believed the Council had excellent prospects of largely increasing their output.

The toast of "The Health of the Chairman" having been honoured, and duly acknowledged by Mr. Bowers, Mr. G. T. Morrall submitted "The Engineers and Contractors;" remarking on the satisfactory way in which the whole of the work had been carried out. Mr. Henry Woodall, in responding, said that his father (Mr. Corbet Woodall) was extremely sorry that he was unable to be present. Only the absolute necessity of attending before a Committee of the House of Commons had kept him away; and though he (the speaker) was proud to represent him, he did so with considerable diffidence. It was gratifying, after a long and somewhat stormy period of preparation, that the Committee had at last entered upon the straightforward, and, they hoped, prosperous, career of the gas supply to their large area. Speaking for his firm, he could not help saying that they regarded much of the expenditure that had been incurred in fighting with their neighbours as purely gratuitous and unnecessary. But that was over and past; and the sooner it was forgotten the better. The Committee throughout had simply stood by the contract entered into between Parliament and the Corporations of Burslem and Newcastle in the interests of the inhabitants of the district, which, though not yet formed, was contemplated and was always possible. The cost of the contest, both in Parliament and at the arbitration, had added heavily to the capital of the undertaking, and proportionately limited the ability of the Committee to supply immediately gas so cheaply as they had hoped to do. The Act of Parliament required that this burden should be paid off by a sinking fund, acting rapidly at first but quickly diminishing; and he was confident that in a short time their most hopeful anticipations as to the price at which gas could be sold would be realized. It was very gratifying to know that the quantity of gas required immediately would be much greater than the information given to them before they entered Parliament justified them in expecting, and that it was not improbable that the producing power of the works would have to be increased at an early date. The larger the consumption of gas, the greater the probability of a reduced price. With regard to the works, they were now fully qualified to make gas of the most suitable quality and in the most economical manner; and he thought they would agree in giving great credit to the Contractor for the buildings (Mr. Gallimore), as well as to all the Contractors for the apparatus. He had to acknowledge the support they had always received from the Committee in the carrying out of the works, and also the cordial co-operation of Mr. Botteley. He was desired by his father to express their grateful thanks to Mr. Hollinshead (the Clerk of the Council) for the unfailing and courteous help he had given in the most cheerful and friendly manner. He had looked up the last five transfers of gas undertakings to local authorities in which his firm had been engaged, and he found that the capital per million cubic feet of gas sold with which they had entered upon the business had been £1915. Now, assuming a consumption of 70 million at Wolstanton, the capital would not be more than £750 per million, or considerably less than one-half the usual charge paid by local authorities when starting gas supply. Notwithstanding the burden to which he had referred, the Council commenced their career as gas manufacturers under very favourable circumstances. He again thanked them for the way in which they had received the toast, and wished every prosperity to the undertaking.

The toast of "Neighbouring Authorities" having been proposed by Mr. W. Boulton, the Mayor of Burslem (Mr. S. Malkin), in responding, said there was no one in Burslem with a disposition "so villainously compounded" as to do any other than wish the Wolstanton gas undertaking the most abundant success. Naturally Burslem looked upon Wolstanton as one of its greatest assets, and they would not have done their duty towards themselves or their ratepayers unless they had offered strenuous opposition to the stand Wolstanton intended to take. It was a purely business move on their part, and one for which he thought the Wolstanton people, in their hearts of hearts, commended them. He hoped in the days to come they would seek the road of compromise, and not the road of law. The toast was also acknowledged by Mr. H. Smallman, the Chief Bailiff of Tunstall.

A novel gas-engine starter has been developed by the Oil City Gas-Engine Company. According to "Engineering Record," it consists of a flash boiler furnishing superheated steam at high pressure which may be used in the gas-engine in the same manner that compressed air is employed for starting large engine units. The boiler is of the coil type and of small capacity, and is heated by a large gas-burner. In operation, the coil is heated to redness, and then a small quantity of water is injected by a hand-pump, which instantly flashes to steam of 400 lbs. to 500 lbs. pressure, and is ready to be admitted to the engine cylinder. The first heating of the coil will furnish sufficient steam to turn an engine for a number of revolutions; and if it then fails to go into operation, a second short heating of the coil will give another number of turns, and so on. A safety-valve set at 500 lbs. protects the device from excessive pressure.

SOME FURTHER REMARKS UPON GAS LIGHTING IN THE UNITED STATES.

[Communicated.]

The writer was very much interested in the "Journal" article upon the remarks of the "Illuminating Engineer" and Mr. Gartley's comments thereon, in regard to the present status and possible future of gas lighting in the United States. Current and past files of the periodicals devoted to the two lighting interests certainly show how much is being written about the best means for promoting sales of electricity, and how little (in comparison) upon the commercial side of the gas industry. It does not follow, however, that the relative amount of commercial work done by the two industries is fairly measured by the articles on such work. Gas-workers in the States have never been prone to write about their activities—possibly because time has been lacking, and also because, until recent years, the previous training of the gas engineer had not been such as to develop a ready writer. Again, there have always been more electrical than gas papers; and to meet the demand for articles has come a supply of writers, and the commercial side of electricity—requiring less knowledge to discourse on than the technical side—has always received more attention.

However, when all these allowances have been made, there is no doubt that much more effort and expense have been devoted to increasing the sale of electricity than of gas. So far, the writer is willing to agree with the "Illuminating Engineer;" but he does not think the conclusion it reaches—viz., that if the gas companies continue to neglect, comparatively speaking, the commercial side of their lighting business, it will be lost to them—has any of the attributes of an axiom. Under American conditions, it has always seemed to the author that electricity and gas, in their race for supremacy in the lighting and cooking fields, were in the position of runners on a circular track, with gas in a leading position on the inside edge, so that electricity is always obliged to cover more ground in order to prevent any widening of the gap. Looking ahead into the future, there does not appear any sufficient straightening of the track to decrease materially the handicap now existing. The past history of the race has been about as follows: Some twenty-five years ago electricity appeared with the announced intention of supplanting gas. Then ensued the usual phenomena peculiar to the development period of any industry, involving the successive production of better and better systems of generation and distribution and of methods of charging for current; and coincident with, and consequent upon, all these changes, there was a great loss of capital. Only within the last decade can the generation and distribution of electricity be said to have been standardized.

Now what is the lighting field awaiting this industry that is just emerging from the expensive process of "finding itself." In the great cities there is undoubtedly a large available business for the electric light, even though the "skyscrapers" usually contain their own lighting plant. Coming down the scale of population to towns of 100,000 and less, the reward for investors in electric securities has never been, and does not even now promise to be, commensurate with the risk assumed. Taking the country over, the margin between selling price and cost per lamp is not large enough to care for proper depreciation and contingent items; and before the present disposition to regulate public utility prices has spent itself, there is reason to expect greater scaling of electric securities than of gas.

On the other hand, What is the position of the gas companies? Thoroughly frightened by the advent of electricity, they began to put their houses in order; and one of their house-cleaning symptoms was a rapid and substantial reduction in price. As a consequence of cheap gas, mantle burners, and probably also of whatever commercial exploitation there has been, practically every building erected within the present, or probable future, limits of a gas company's system is piped for gas, and when tenanted, and gas laid on, uses it for fuel and lighting. Again, the thousands of dwellings unpiped because built in the days of high gas prices, have in recent years largely become users of gas—often first becoming acquainted with its merits through the gas-range, and then accepting the offer of the gas company to run house piping at cost.

Therefore, gas lights its millions, and electricity only its tens of thousands of houses. What is required of electricity to secure this field? In the first place, the ability to sell current at much lower rates. In the second, to reach existing houses, the wiring of these houses, and the provision of a distribution system at great expense, because required to be laid under paved streets. Thirdly, to be ready to supply future houses at the minimum of expense, to do which it will be necessary to persuade builders to wire these dwellings as erected, and also to find capital to lay the distribution mains before the streets are paved—capital which may not bring adequate return for many years. These handicaps will not be overcome easily or soon; and, especially in the item of distribution expense, the coming years have far less terrors for gas than for electricity. The gas company lays its system underground before a street is paved, and is able, at slightly increased expense, to make the main and service large enough to care for a great increase in business. The electric company, on the other hand, does not know what business to count on, is unable at the

start to stand the expense of underground work, and begins with an overhead system. To-day most of the electric distribution systems are overhead; they represent costly changes from original installations; they are apt to be overloaded; and they are facing the necessity of going underground in response to the public demand for the "City Beautiful."

The moral of all this is not that a gas company should neglect the possibilities that may exist in its local situation to increase its lighting field, but that such consideration of what steps may be necessary to strengthen the popularity of gas as an illuminant should be accompanied by an appreciation of the favourable position occupied; and the possible waste of money involved in any such campaign of exploitation as may be absolutely necessary to keep the electric company in position to meet its obligations. To conclude with a modern simile: Increased sales of gas for lighting come more or less as a balloon ascends—without any effort whatever; while to keep sales of electricity on the rise, an aeroplane is needed.

TOWN GAS FOR MOTIVE POWER PURPOSES.

TIME was when gas undertakings and engine makers, with a community of interest, worked together in the endeavour to encourage the use of gas—that is to say, town gas—for motive power purposes. The advent of producer gas, and particularly of the suction type, has necessarily altered this state of things, and the interests of the two workers are no longer identical. Indeed, instead of having a common cause with the town gas undertaking, the engine makers have created a separate camp, and seek for themselves to command the whole field of gas power. The situation is not a surprising one, since in producer gas they have a commodity which requires not only an engine, but the plant necessary for its production; and having supplied these, there is the further prospect of gain in the repair and renewal of both. The former ally is now virtually ignored, except in those cases where a customer specifically asks for an engine to work with town gas. The makers' advertisements in practically all engineering periodicals deal, to all intents and purposes, solely with producer gas plants and engines; and if reference is made at all to town gas, it is but to suggest its expense by unfair and inaccurate comparisons of cost. Examples of the method are not infrequent: "Suction gas the cheapest power known; about one-third the cost of town gas driving," "Ten H.P. for 1d.," and the like. Some make even wilder claims than these. Other indications of desertion will readily occur to mind. At the recent Manchester Gas Exhibition, two makers only had stands; and they did not neglect the opportunity of advertising suction gas or suction-gas apparatus. No one for a moment can blame manufacturers for pushing the phase of their industry which pays them best. It is ordinary business that, under circumstances due to the development of industrial power, they should work for their own prosperity and success; and if producer gas, whether of the pressure or suction type, is to achieve the desired results, naturally the manufacture of plant for this purpose will stand first. The question, however, arises as to where their *quondam* co-operators stand in the race. Practically deserted by the makers, they are thrown on their own resources for the retention and the progress of gas-engine custom.

It seems now to be the general practice on the part of engineering and similar papers to think and to talk in producer gas alone when discussing power gas problems. The public, too, is afforded, through the General Press, opportunity after opportunity of knowing all that is considered necessary about the "new" industrial power; and the necessary information appears only to deal with the bare cost of the fuel. Apart from the daily papers and engineering periodicals, there are only two or three magazines devoted exclusively to gas and oil used for power purposes. Even with these there is a tendency to consider town gas out of the running, though the subscribers must and do include many consumers of gas from the public supply. The "Gas and Oil Power" magazine goes further, however; for in the January issue there is published a "special" table showing the wonderful economy of suction gas by making in its favour extraordinary comparisons of the cost of power in 222 towns and districts. In parallel columns are given the respective costs per B.H.P. hour of electricity and of town gas; and these are contrasted with a figure which is supposed to represent that of suction gas. The table is worthless because of its inaccurate method; but how is the gas-engine user, inexperienced in suction gas matters, to know that? One instance, taken at hap-hazard, is that of Bradford. With town gas at 1s. 11¾d. per 1000 cubic feet, the cost per B.H.P. hour is given as 0·43d. Against this the cost of suction gas per B.H.P. hour is stated to be 0·168d., based on special washed anthracite beans at 31s. 3d. per ton delivered. The town gas figure of 0·43d. (which by-the-bye is evidently derived from a gas consumption of 18·1 cubic feet per B.H.P.) includes, of course, all charges for fuel, manufacture, maintenance, distribution, and capital. The comparative item of 0·168d., equally of course in accordance with the usual methods of the advocates of suction gas, deals only with the bare cost of fuel; and this is taken at 1 lb. per B.H.P., nothing being allowed for stand-by losses. The charges for gas making, renewals, capital, and other inevitable expenses, are left to be discovered by the user after he has purchased and worked the plant; and these charges for ordinary powers do not, as a matter of fact, materially differ from those included in the price of town gas. The example cited is illustrative of the method followed throughout the table of the remaining 221 towns referred to.

Yet another power gas magazine, "The Gas and Oil Engine Record," would appear to regard its position as a technical periodical as one of relative neutrality. Producer gas, both pressure and suction, is perhaps regarded as the industrial gas of chief importance; and many examples of its cost have from time to time been given. Nevertheless, town gas is treated in no cavalier fashion, and has indeed now and again come in for some slight consideration. In the February issue, just to hand, this has been markedly the case; and we cannot forbear noting the fact. Under the heading of "Gas Supply Companies and Gas-Engines," our contemporary discusses the position of the existing public undertakings with regard to the supply of gas for power purposes, and incidentally gives some excellent advice. The suggestion is made that conductors of gas undertakings have not shown any readiness to assist the makers in the development of the gas-engine, and consequently the latter have to thank the constructors of producer plant rather than gas companies for the great progress their business has made during the last few years. It will be inferred from our opening remarks that we do not altogether agree with the view that town gas suppliers have in the past neglected their share of seeking gas-engine custom. In any case, it should be remembered that a few years back the gas-engine, in its then competition with the steam-engine, was much handicapped by relatively heavier prices for gas, due to the expensive working in manufacture and to the bogey of high candle power. The cheapening of town gas and the adoption of a more favourable price for power purposes, however, bring public gas undertakings into a position to compete for a good deal of engine custom. Our contemporary points out that there are still ample opportunities for the development of the gas power industry in the various districts served with town gas, for there exist "very many old steam-engines of doubtful pedigrees and lusty appetites in the innumerable factories" to which light is supplied; and "it requires no great effort of imagination to conceive that, given the adequate attention necessary to the subject by a gas company's official, the majority of such factories would yield to the temptation of throwing aside their present means of power generation in favour of the much more economical and convenient gas-engine." It is hinted that gas undertakings seem afraid of suggesting up-to-date methods of power generation, lest the owners should go "straight into the arms of the suction gas plant man." The "Record" remarks, and with a good deal of truth, that gas undertakings, being in constant touch with users, and having the privilege of entry into manufacturing premises at least once a quarter, have large possibilities for extending the use of gas-engines. It would be to their interest if their sales department included a responsible official who could, from practical experience, advise and decide on all points arising in the application of gas for power purposes. A well-qualified man would be able to put the claims of gas power before any probable customer, and discuss the adoption of either the site or the machinery for the accommodation of a gas-engine. With ability to inspect and to test any existing steam-engines or industrial machinery, he would also be able to prepare a scheme of power transmission in connection with gas-engines advantageously placed to suit the purpose in view. But, in addition to advising the adoption of town gas as a motive power, gas undertakings, through their official, are in a position to see that their customers obtain from makers the particular engine which will best serve the end to be achieved. With the engine once fixed, the customer has always at command the company's official for reference and help, knowing he has no other object in view than seeing that the commodity that is sold by his employers is rightly and properly used.

To all this we would add that if argument fail, and the power user persists in going "straight into the arms of the suction gas man," there is still the opportunity of offering a stand-by town gas supply; for, as Heywood said centuries ago: "A friend is never knowne till a man have neede." It is by no means an unheard-of experience for the "suction" of the engine to be exerted on the street main rather than on the producer; and an instance occurs to mind where a 40 B.H.P. suction-gas plant and engine have been for the past eighteen months regularly and generously—at the rate of over half-a-million cubic feet per annum—helped in this way. Experiences of this kind will not tend to dispose gas power users to spend money on any serious renewal of the producer part of their plant.

Our contemporary has something to say as to the question of price. "The average engine user is not attracted solely by the cost of operation. What he desires is reasonable economy with reliability and continuous operation of his machines." This is a statement worth bearing in mind. If there is any difference in favour of suction gas as compared with town gas at (say) 1s. 9d. to 2s. per 1000 cubic feet, which we still question, there is much to suggest that "The Gas and Oil Engine Record" is not far from the truth in making the statement just quoted. "There is no doubt whatever," our contemporary continues, "that the average factory owner would much prefer to use town gas if it could be proved to him that by so doing he can rely upon the willing assistance of the company whose interest it is to show him the way to obtain in the form of power as much of the heating value of the gas purveyed as can possibly be converted into work."

THE AUTOMATIC CONTROL OF STREET LIGHTING AT TIPTON.

By Sidney O. Stephenson.

As the publication of some of the results of our system of automatic lighting and extinguishing of street-lamps has aroused much interest, and brought many inquiries for fuller particulars, I have pleasure in acceding to a request for a further article giving all the information and experience at my command. Judging from the correspondence and inquiries I have received, there seem to be many who, while charmed and interested with the automatic control of street-lamps, are letting "I dare not wait upon I would;" and it is understandable that they should regard results from a fairly large parish, having a complete system, as of more value than small or partial installations.

The system we have adopted, after much consideration, is that of Messrs. Alder and Mackay, of Edinburgh, and the patent of Mr. John Anderson, of that firm. It is of the pressure-worked class—that is, it is operated by a wave of pressure in excess of the maximum working pressure, and is given by manipulating the station governors at the works, or it can, of course, be done by a pressure-raising fan, as mentioned by Mr. Copp in his recent Presidential Address before the Midland Association.

Our reasons for adopting this particular apparatus were, first, that we preferred a system whereby the lighting or extinguishing could be done at will at any time, instead of, as in the case of clockwork apparatus, the times of doing so being inexorably set for the week. The fact that the operation could be conducted at the works without trouble or extra expense was an additional inducement. Tipton is subject to fogs; and we had no desire, in the event of such a happening, to have to wait until the clocks worked round to the set time for the lamps to light up and illuminate the premature darkness, or even to have to send men round to operate them, when by another system this trouble could be avoided. Secondly, it appealed to us as being a simple apparatus, with little mechanism to get out of order. Thirdly, it is not bulky, and would not entail a lot of alteration to the lamp-heads and expense in fixing, or occupy much space in the lantern. Lastly, it was much the lowest in cost, as well as being easy and cheap to fix, and therefore entailed least outlay of capital. So, after having made a lengthy trial of the apparatus and found it satisfactory, we gave the order for the complete installation, and proceeded to fit the whole of the street-lamps.

The action of the wave of pressure on the apparatus is to raise a bell which is connected up internally to the mechanism, and which is thereby operated. The bell is weighted to overcome the maximum working pressure; and it is only when the excess pressure is put on that the bell rises and brings about the lighting or extinguishing of the lamps. During the fixing, we maintained a pressure on the town about 3-10ths in excess of the maximum working pressure, and merely weighted the bells to just overcome this. My reason for doing so was to guard against any possible trouble afterwards, if at any time the town pressure should accidentally rise a tenth or two.

It is about 2½ years since we first tried Messrs. Alder and Mackay's apparatus; and for nearly the whole of last year we had fitted practically all our lamps, numbering 456, of which 14 are refuge or special lamps. All our Council are unanimous as to the system being a success; and as this body is probably about the most critical Council in the kingdom, it speaks volumes. The townspeople are no less satisfied. The expense of installing the system, including the cost of apparatus, mercury, and labour in fixing, came to slightly under £1 per lamp.

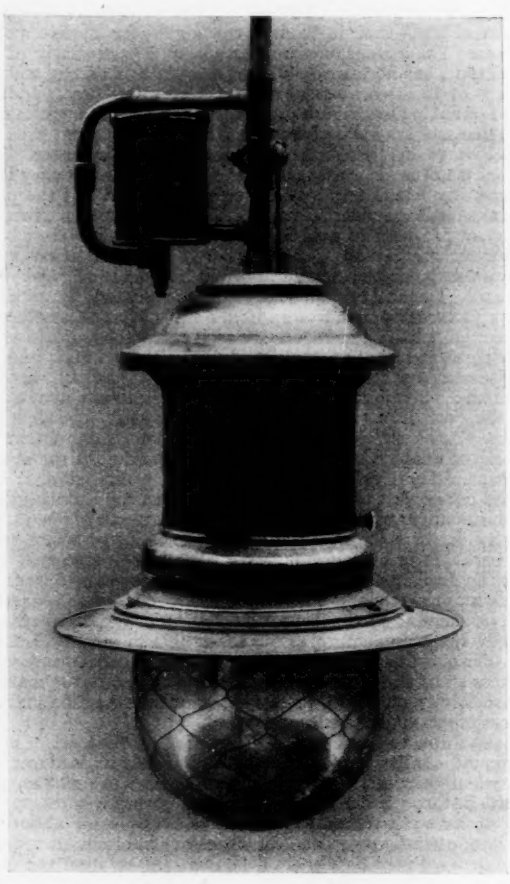
In adopting this or any other system of automatic control, it is very necessary that the lanterns should be good, and as wind-proof as possible. The success of the system is dependent upon the bye-passes keeping alight; and this can only be ensured with good lanterns. It is also necessary for the apparatus to receive a little regular attention; and for this reason the attendants employed to clean and look after the lamps should be fairly intelligent, reliable men. The attention I refer to is the oiling of the guides with just a spot of almond oil, so that the bell may work freely. This is done when the lamp is cleaned; and at the same time the attendant sees that the apparatus is in proper working order.

Before the adoption of the automatic system, we had five men employed to light, extinguish, and clean the lamps, and another to look after the burners and renew mantles—making six in all. They are now replaced by three men, whose duties are to clean the lamps and attend to the apparatus, bring any into the works that may be out of order and replace them, keep the bye-passes and burners in order, and renew the mantles and glasses, &c., where required—in fact, do all that is ordinarily necessary in the maintenance and care of the street-lamps. They also go round the parish after lighting-up time to note any case of failure. This does not necessitate going through every street, as side streets can be seen from the main roads. These men are paid the same wages as the former lamplighters—viz., 23s. per week, with uniform—and, in addition, receive a bonus equal to 1s. per week, dependent upon the good condition of their lamps. This bonus is payable monthly, and is subject to deduction should there be cause for complaint. I find that the bonus is an incentive to the men to keep their lamps in good trim.

I have not kept a record of the failures; but the percentage is very low. My lamp attendants tell me they rarely exceed, or even amount to, a dozen; and frequently there are none at all. When they do occur, it is nearly always owing to the bye-pass having blown out. The cases of the apparatus itself failing are very rare indeed; and it is a most unusual thing to see a lamp alight in daylight. On one occasion, the man in charge of the governors at the works allowed the town pressure to rise too far, and some of the lamps were lighted in consequence; but this was soon remedied by the attendants going to the lamps affected and putting the apparatus right again—a very simple matter.

The system is applicable alike to flat-flame, upright incandescent, and inverted incandescent lighting; and I give an illustration of a Graetzin lamp showing Messrs. Alder and Mackay's apparatus attached.

I have been asked as to the saving in gas by this system of lighting and extinguishing the street-lamps automatically. This is a difficult question to answer exactly, as it is only possible to estimate the amount. But as, apart from the fact that the lamps are not now alight before or after they are necessary, about half



the lamps are extinguished at midnight (our system is arranged so that we extinguish every alternate lamp and two burners in the three-light lamps at midnight), I should put the saving in gas at something like 2 million cubic feet per annum. This quantity, however, can only be approximate.

The saving in labour I have already given as £170 per annum by the reduction in the public lighting staff of three men. As to the saving in mantles, rods, and glasses, I make no apology for once more giving the figures showing the three years 1903, 1904, and 1905 under the old conditions compared with 1907 with automatic control:—

Year.	Mantles.	Rods.	Glasses.
1903 ..	6445 ..	968 ..	4099
1904 ..	6806 ..	858 ..	2891
1905 ..	7195 ..	689 ..	4255
1907 ..	4508 ..	333 ..	2248

This would give an approximate saving in gas, labour, and materials of over £300 per annum.

I have heard it said that with this system the lighting-up would have to be done before it was really dark, as when it is dusk and time for the lamps to be alight everybody would be lighting up, and cause such a draught on the mains that the extra wave of pressure would be absorbed by it, and the apparatus would fail to operate. This is a feasible idea, but I can only say that I do not find it so; and I think that if the apparatus is kept in working order, and the guides oiled, no trouble will be experienced. We certainly do not light-up at Tipton till it is thoroughly dusk, and find no trouble

of the kind. I have furthermore had pressure charts taken at the lamps from various parts of the district, both in main roads and in side streets, and find that when the wave of pressure is sent forward these charts show a corresponding increase to that indicated on the works chart; and Tipton is, I think, as awkward a district as any for distribution.

As to the amount of extra pressure, and the time this should be kept on, I should say that usually 1 inch extra would be sufficient, and in some towns even 5-10ths. But Tipton is a mining district, and subject to the peculiarities and disturbances of such a locality; and so I use 1½ inches to be sure. On the experimental bench, 2-10ths or 3-10ths is sufficient to work the apparatus; but the experimental bench is one thing and the distribution system of a town is another. Again, as to the duration of the extra pressure wave, half-a-minute is sufficient; but I prefer to keep it on for a minute-and-a-quarter. I may say here that pressure travels very quickly, and when the excess is put on it acts practically instantaneously at a distance of two miles.

It may be thought that such an excess of pressure would result in complaints from the consumers. Again I can only say that I have not found it so. The only trouble I have had has been from some old wet meters. But these I sent to the makers, and had them altered to stand 6 inches pressure; and this put the matter right. If any consumer should by chance find the waves of pressure objectionable, there is an easy solution of the difficulty in the shape of burner governors, of which there are some very good types on the market from which to select. I do not recommend governors at the meter, as I regard these as being wrong in principle. To be satisfactory, they need altering to suit the variations in consumption; and trouble of this sort is beyond the average consumer. Burner governors are much more practical and satisfactory. Some of my consumers, far from being annoyed, rather appreciate the notice which the wave of pressure on the gas gives them at midnight that it is bedtime; and doubtless it also serves as a reminder to long-staying visitors.

In conclusion, I have no hesitation in saying that automatic control of street lighting by gas is a practical success, and has come to stay. There are several good types of controllers on the market—the present article being my own experience of one of them; and I look to great advances in this direction in the near future.

THE DISPOSAL OF TOWN'S REFUSE.

THE disposal of town's refuse in an effective manner is undoubtedly a matter of importance, and one which closely concerns the general health and physical well-being of the community. When, too, this same refuse may be converted into products of value, it becomes also a subject of interest from a financial standpoint. The dust destructor is rightly looked upon as a great improvement, in any case so far as sanitary considerations go, on the variety of other methods adopted by local authorities.

Disadvantages of the Present Methods.—It was till recent years the almost universal custom to dispose of town's refuse by removing it, either to some "tip" on the outskirts of the town or into railway trucks, whence it would be shot on waste land in some country district. In either case the refuse was thrown down in heaps and left to ferment, emanating pestilential odours and spreading disease in the surrounding neighbourhood. This practice is, of course, open to the greatest objection; for it is essential that refuse of a decomposing nature should, for obvious sanitary reasons, be absolutely destroyed. The dust destructor most certainly destroys all germs of disease, and is at the same time productive of power—whether profitably or not is a matter of dispute; but its greatest drawback is the nuisance caused by the dust which escapes from the chimney shaft.

Description of the New Method.—A new system for the disposal of refuse has recently been introduced by the Refuse Converter Company, whose method is open to none of the previously-mentioned objections. The system employed is analogous to coal carbonization—in fact, it is suggested that the disposal of town's refuse could be conveniently carried out in, or in connection with, a gas-works. House refuse chiefly consists of the waste from fires, the waste from vegetables and fruits, the unusuable parts of meat and poultry, waste paper, rags, packing, and a great variety of other matter consisting of water, organic compounds, and mineral substances all of which may be converted into gas, tar, and ammonia; leaving a carbonized residue of some fuel value. Tins, bottles, broken crockery, and other similar things would also be found among the refuse. The new method may be quite briefly described as follows: The refuse is brought into the works in carts and shot into a hopper; the tins, bottles, &c., having first been removed. All large pieces are here cut up into a convenient size by a number of knives revolving at the bottom of the hopper. The refuse is shot out in equal quantities of a sufficient amount to fill one of the drying boxes. Each of these boxes contains sufficient to fill one retort; and it is so arranged that the refuse, after drying, is mixed with its proper proportion of coal before being fed into an inclined retort. The drying boxes are conveniently situated, so that a supply of hot air (about 200° C.), heated by the waste gases from the settings, may be drawn through by an exhauster. It is found that refuse contains on an average from 25 to 33⅓ per cent. of moisture, which is made to serve a useful purpose; for the heated air, after passing through the drying boxes and becoming saturated with steam, is used for the primary air supply to the furnaces.

Resultant Products.—One ton of wet refuse, giving (say) 14·6 cwt. of dry refuse, will produce without admixture with coal: 1567 cubic feet of gas of 367 B.Th.U., 15 lbs. of sulphate of ammonia, and 14 cwt. of carbonized residue. 14·6 cwt. of dry refuse + 3·65 cwt. of coal (80 per cent. refuse and 20 per cent. coal) will produce 3483 cubic feet of gas of 483 B.Th.U.,* 20 lbs. of sulphate of ammonia, and 14 cwt. of carbonized residue.

Details of Trials.—Two separate experiments were carried out—the first in the experimental refuse converter plant at Holloway, the second at Barking Gas-Works. The first test furnished complete and satisfactory data on most points, except in regard to the heat value of the carbonized residue and the proportion required to supply the heat necessary to work the retorts. The second test, however, showed that the heat required to carbonize one ton of refuse and coal, mixed in the proportions already mentioned, was approximately 70 per cent. of that required to carbonize one ton of coal. During the Barking test, it was ascertained that about 5 cwt., or 35 per cent. of the production of carbonized residue from 1 ton of wet refuse (or 14·6 cwt. of dry refuse) mixed with coal was required as fuel. From these data it is shown that, with coke at 13s. per ton, the carbonized residue may be valued at about 5s. 6d. per ton. This proportionate value is further supported by the relative difference of the calorific value of the two fuels. The calorific value of carbonized residue is given as 5134 B.Th.U. per lb., and that of coke as 12,800 B.Th.U. On this basis, coke at 13s. per ton, would be equivalent to residue at 5s. 4d. per ton.

Estimated Profits.—With regard to the prospects of the system viewed from a financial aspect, Mr. Humphrey, in his report to the Company, prepared an estimate of the profit to be derived from a plant dealing with 100 tons of wet refuse per twenty-four hours.

Balance-Sheet as Given by Mr. H. A. Humphrey.

	Expenses. £ s. d.	Receipts. £ s. d.
Payment by local authority at 2s. per ton		10 0 0
Value of gas (of 600 B.Th.U.) at 1s. 6d. per 1000 cubic feet		21 10 6
Value of ammonia		6 14 9
,, ,, surplus residue, at 3s.		13 18 0
Cost of coal at 13s.	11 17 4	
,, ,, labour for drying at 6d. per ton	2 10 0	
,, ,, labour in retort-house at 4·94d. per charge	7 18 1	
Annual charge at 10 per cent. on estimated outlay	5 0 0	
	27 5 5	52 3 3
		27 5 5
Net profit on 100 tons		24 17 10

Or profit on one ton (say) 5s.

The cost of the disposal of town's refuse varies to some extent; but the cost to the Borough of Hammersmith at 2s. 7d. per ton is stated to be a fair average example; so that 2s. per ton is well within the mark. With regard to the comparatively low-grade gas produced by the carbonization of refuse, it is hardly correct to assume that 1567 cubic feet of 367 B.Th.U. is equivalent to 960 cubic feet of 600 B.Th.U. This gas, mixed with that from the coal used, would give an average quality of 483 B.Th.U. As to whether gas of 600 B.Th.U. may be valued at 1s. 6d. per 1000 cubic feet depends largely on the use to which it may be put. In the case of local authorities using this system, the gas might either be employed to supplement the ordinary gas supply, or else be utilized in gas-engines for the purpose of generating electricity. The estimated profit from the production of ammonia should be realized with good working if converted into sulphate of ammonia; but the surplus residue would have been more fairly valued at 2s. 6d. per ton of mixture carbonized, instead of 3s. The latter figure ascribes a rather high efficiency to the furnaces. The remaining estimates, with the exception of that in connection with the capital charges, are not unreasonable. But the exception mentioned appears to be distinctly under-estimated, not so much in the estimated cost of the installation as in the annual charge of 10 per cent. only on the outlay. Interest at the rate of 4 or 5 per cent. must be allowed for; leaving 5 or 6 per cent. for wear and tear and depreciation of the plant. It should be mentioned that the cost of the installation is estimated at £115 per mouthpiece. This includes "retort-house, settings, chimneys, furnaces, all ironwork, including mains and conveyors, &c., also tools and implements, necessary storage, and approaches," and, in addition, seven sets of drying plant at £600 each. No mention whatever is made of the condensing, washing and scrubbing, and purifying plant; and it is not clear whether they are included in the cost of the installation.

It will require six settings (through), containing eight retorts each, to deal with 100 tons of wet refuse per day—an additional setting is allowed as a stand-by. Therefore, 112 mouthpieces, at £115 each, will cost £12,880; seven sets of drying plant, at £600 each, will cost £4200; £1170 is allowed for "sundries"—making in all a total of £18,250. An annual charge of 10 per cent. on £18,250, equals £1825—equivalent to a charge of £5 per

* This figure is rather excessive, for Mr. H. A. Humphrey, who carried out the experiments, estimates the yield of sulphate at so high a figure as 1·25 tons per 100 tons of coal (28 lbs. per ton).

day for plant of this size. Plant of sufficient size to carbonize 100 tons of wet refuse, with the necessary proportion of coal, would deal with about 60 tons of coal. The wear and tear, including depreciation, in a gas-works carbonizing 60 tons of coal daily, would amount to at least 2s. 6d. per ton, or equivalent to a charge of £7 10s. a day. Taking what may seem a pessimistic view of the prospects of the system, it will be interesting to draw up a balance-sheet with alterations in the questionable items:

Balance-Sheet.

	Expenses. £ s. d.	Receipts. £ s. d.
Payment by local authority, at 2s. per ton . . .		10 0 0
Value of gas at 1s. per 1000 cubic feet		14 7 0
,, ammonia		6 14 9
,, surplus residue at 2s. 6d.		11 12 0
Cost of coal at 13s. per ton.	11 17 4	
,, labour for drying at 6d. per ton	2 10 0	
		42 13 9
,, ,, in retort-house at 4·94d. per charge.	7 18 1	
Wear and tear, including depreciation	7 10 0	
Interest, at 5 per cent. on outlay	2 10 0	32 5 5
Net profit on 100 tons		10 8 4
,, ,, ,, 1 ton 2s. 1d.		

Only those items which were included in the first balance-sheet are inserted above; but it should be pointed out that several additional items should be included, such as, salaries, purification (if required), rates and taxes, insurance, and a few other minor items.

With regard to the value of the gas at 1s. per 1000 cubic feet, this figure is certainly below the average cost (including all works' costs) of manufacturing gas; but there are a great many works whose "net cost into holder" is below 1s. per 1000 cubic feet sold, and would be still lower if calculated on the "gas made." It is not clear whether Mr. Humphrey's estimate of 4·94d. per charge, which is stated to be "cost of labour in connection with working retort-furnaces and handling coke, &c.," includes all labour on the works. If not, a further sum must be included under wages.

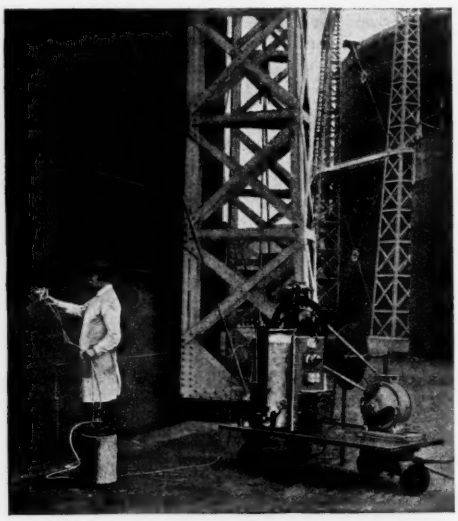
Conclusions.—From a technical point of view, the system merits attention, and it would be interesting to hear further particulars, such as the composition of the gas, the quantity of sulphur impurities, the quantity and quality of the tar, about which no details are given, though we are told it is one of the products. Sanitary considerations, too, are alone sufficient to render the system well worthy of an extended trial; and for this reason it is hoped that local authorities will look kindly on the new method. From a financial standpoint, it appears probable that the Refuse Converter Company have introduced a system which bids fair to effect a saving on any previous method, though it is surely too sanguine to expect a "net profit of 5s. per ton." This is a big figure for such comparatively worthless material as household refuse to realize. Even if it only realizes 1s. per ton, it will still show a handsome saving over any other method.

Fuel economists have discovered that, to obtain the greatest possible value from fuels, especially in the case of those of a low-grade type, it is infinitely more profitable to convert the fuel into gas, recovering the bye-products, and consuming the gas in internal-combustion engines, rather than to consume the fuel in its solid form under boilers, and so obtain power by means of steam-engines. This well-known fact hinges on the relative efficiency of steam and gas plants. While with the former 10 per cent. efficiency is about the usual working, with the latter plants 25 per cent. efficiency may be easily obtained—and this from the same fuel. Therefore, it is not unreasonable to expect that a gaseous system such as that of the Refuse Converter Company should obtain two-and-a-half times more power from a given quantity of refuse than the dust destructor which uses it under boilers for steam-raising.

"AEROGRAPH" SPRAY-PAINTING APPARATUS.

THE pressure of winter demands for gas is easing off; and presently the gas engineer will be considering the questions of extension, improvement, and renovation that he must undertake during the summer months. The painting work that has to be done in gas-works is of an extensive order; and it is of a character that is particularly suitable for spray-painting. Good accounts are heard of the spray-painting outfits of the Aerograph Company, Limited, of No. 43, Holborn Viaduct; and inspected samples of work, both plain and decorative, carry conviction that here there is offered a practical and effective system. The outfits can be had fitted with hand or power pumps, with electric or petrol motor, compactly arranged and running on trolleys. A plant worked by an electric motor is seen in the illustration showing the employment of one in the painting of a large gasholder in a suburb of London.

An outfit consists of the handpiece or "Aerograph" proper, an air-compressor, the paint pot and tubes, and the motor. Of course, the apparatus can be supplied without the motor if required. The spraying nozzle of the handpiece can be made large enough to cover at almost any speed desired; but in practice it has been found best to make it only of a size to do from



Painting a Gasholder by the "Aerograph" Apparatus.

3 to 5 square yards per minute, and give a good even coat. The hand spray-piece is, of course, a most important feature of the arrangement; and it is ingenious in its design. A flexible tube for compressed air connects with the nipple. The finger lever controls both the air-valve and a colour valve in the nozzle, so that little or much colour as desired may be allowed to pass into the current of escaping air. The colour may be supplied, under pressure, through a flexible tube from a large paint-pot, and pass through the outer curved tube to the nozzle, or in smaller quantities from the cup (shown separately in the illustration), which is provided with a place for attachment at the top near the nozzle, and when so attached cuts off the supply through the curved tube

The Spray Painter Handpiece.

The cup is also useful when small quantities of colour are wanted with frequent changes. A ball joint is also provided for permitting work on ceilings or places that might otherwise be somewhat difficult of access. The pump fitted for power operation is strongly built, and is furnished with metal expanding rings and metal valves; and it will supply enough air up to 30 lbs. pressure for three spray painters. If desired, the pump can be supplied with an automatic regulator, which is designed to effect both a saving in power and wear and tear. The air-tank is provided with gauge and safety valve. There are several other interesting features about the various plants, in regard to which prospective users can readily inform themselves. It must be conceded that for cheap, expeditious, excellent, and uniform work spray-painting plants have an extensively proved value.

Southern District Association of Gas Engineers and Managers.—As mentioned last week, the annual meeting of the Association will be held at the Hotel Cecil, Strand, on Thursday. In addition to the Inaugural Address of Mr. Norton H. Humphrys, Assoc.M. Inst.C.E., F.C.S., a paper on "The Workmen's Compensation Acts" will be submitted by Mr. Thomas Berridge, of Leamington. It will, however, be taken as read, and will be discussed on the first available opportunity. At the close of the business the annual dinner will be held.

ISLE OF WIGHT GAS ASSOCIATION.

Annual Meeting at Shanklin.

The Annual Meeting of this Association was held in the Board-room of the Shanklin Gas Company on the 29th ult.—Mr. F. C. Taylor, the Engineer and Secretary of the Company, in the chair. There was a good attendance of members, who were cordially welcomed by the Chairman of the Company (Mr. F. Cooper). The business was chiefly of a routine character; but the Secretary and Treasurer (Mr. E. H. Millard, of Cowes) was in a position to report that the Association possesses a creditable and satisfactory balance at the bank. In the course of the report of the Management Committee, which was approved, it was mentioned that in spite of heavy advances made in the price of coal, the Gas Companies on the Island showed the industry to be in a flourishing condition. The usual dividends had been maintained; and it was matter for congratulation that nowhere had it been necessary to advance the price of gas, as had been done in many parts. The Committee were pleased to note a tendency towards the reduction in the price of coal in the immediate future. Mr. Millard was reappointed to his office. Opportunity was afforded the visitors of witnessing the work performed by the newly-introduced coal-conveyor from the Isle of Wight Railway into the retort-house, in substitution for the coal-shoot into the stores; and the inspection was productive of gratification at the economical results obtained by the installation. After the business, "high tea" was served in the Board-room; and the social portion of the proceedings was of the usual character. Mr. R. Fish proposed "The Health of the Chairman," and a hearty vote of thanks to him for his able conduct of the business that day. He referred to the excellent service Mr. Taylor had rendered the Shanklin Company, and in proof of this stated that when Mr. Taylor entered upon his duties some 27 years ago the total annual make of gas was about 4 million cubic feet, whereas now it was 30 millions. The works at that time compared very badly with their present completeness and efficiency. They were then on a very limited scale; but now they were equipped in a most up-to-date style. He felt sure that the coal-conveyor which had been recently provided would be a source of profit to the Company. When inspecting the retorts, he inquired of Mr. Taylor how many cubic feet of gas he obtained per ton of coals, and he replied 11,200. This was an extraordinarily good make. The Shanklin Gas-Works were the most complete in the Island; and he congratulated Mr. Taylor and the Company upon them. The toast was received with great cordiality. In acknowledging it, Mr. Taylor said he was not deserving of all the credit, because during the last year the entire management of the gas manufacture had been under the direction of his son, Mr. Fred Taylor. The erection of the coal-conveyor had also been his son's work and that of their own staff, as the man who came down to superintend the work met with an accident. He was delighted with the conveyor, and so were his Directors. It effected a saving of 2½d. per ton for every ton of coal conveyed into the stores. The coal could be deposited in eight different positions, and it was never touched from the time it left the trucks. During the previous week, they transferred nearly 600 tons of coal into the stores at the rate of 12 tons an hour; and the apparatus worked without a hitch. Mr. Taylor acknowledged the cordial support given him by his Directors, who, he said, were at all times prepared to carefully consider improvements for the better equipment of the works.

SCOTTISH JUNIOR GAS ASSOCIATION.

EASTERN DISTRICT.

A Meeting of the Eastern District of the Scottish Junior Gas Association was held in the Heriot-Watt College, Edinburgh, on Saturday week—the PRESIDENT (Mr. D. Bisset, of Edinburgh) in the chair.

GAS HEATING FOR DOMESTIC PURPOSES.

Mr. R. B. WADDELL (Dunfermline) read a paper with this title, in the course of which he said:—

It is now a number of years since gas-fires were introduced to the public, during which time it can hardly be said that their progress has been rapid; but we can say it has been steady. With more experience on the part of the makers of gas-fires, with gas at a lower price, and a quality more suited for the purpose, together with the greater need for them as labour-saving appliances, and with practically no competitor in the way, success cannot but be ours. The greater cost of heating rooms in the past has resulted in the use of gas-fires giving convected as well as radiant heat. To further reduce the cost, the ventilation of rooms by the chimney has sometimes been too far reduced, with the consequence that the inhabitants have had their health impaired, just as it might be with a slow combustion stove, or even hot-water radiators, after which time it is most difficult to get the same people to believe that a gas-fire can be made as healthy and ventilate the room as well as a coal-fire. Now, while these errors of overdrying the atmosphere of rooms must beyond question be avoided, this does not exclude the employment of convected heat along with radiant heat where fires are used for short periods, and where the atmosphere to begin with is moist; but where fires are used for long periods in living rooms, nothing but radiant heat should be used. In my opinion, there is room for improvement in the make and design of gas-fires to give greater efficiency in radiant heat than at present—that is, so that they will send a greater proportion of the amount they yield into the room, and less up the chimney.

Starting with the fact that whatever may be the heat value of a gas this value is always obtained when the gas is burned to completion, as in a white flame, an ordinary bunsen, or a high-pressure bunsen flame, the sum of the radiant, convected, and conducted heat, *plus* that contained in the products of combustion, is always a constant amount; but the proportions of these different forms of heat are variable. The heat from slow combustion coal or coke stoves, so-called hot-water and steam radiators, and some of the cheap forms of gas-stoves, where the flame is nearly or altogether enclosed, and where most of the heat is withdrawn from the products of combustion by the atmosphere impinging on tubes containing the products, and within the room, is largely convected. We are all aware that there are now a great number of big factories, with highly-trained scientific and artistic staffs, who have already sent out some beautiful fires, equally as healthy as any coal-fire can be; and I am certain when these fires are properly selected to suit the rooms they are to heat, there will be little cause for anyone to complain. I have already said I think that improvements can be made in this better class of fire, when considered along with proper conditions of gas supply and chimney for ventilation, though I regret that I have not been able to make any experiments to prove this. The improvement must be in sending a greater proportion of the total heat evolved by the burning of the gas into the room in the form of radiant heat, which warms the walls, objects, and occupants of the room, leaving the air cool and fresh for breathing.

TABLE *of the Ratio of Loss of Heat at Very High Temperatures by the Formulæ of Dulong.*

Temperature of the Heated Body.	Temperature of the Air in Contact with the Body and of all Surrounding Objects.	Difference of Temperature of the Body and of the Air, and Surrounding Objects.	Ratio of Heat Lost at Different Temperatures by	
			Radiation	Contact of Air.
Deg.	Deg.	Deg.		
490	60	430	3·10	1·980
600	,,	540	4·19	2·085
780	,,	720	7·17	2·230
960 Red just visible .	,,	900	12·68	2·348
1140 ,, ,, . .	,,	1080	23·01	2·450
1320 Dull red . . .	,,	1260	42·70	2·540
1500 Dull cherry red .	,,	1440	80 67	2·620
1680 Cherry red . . .	,,	1620	154·50	2·693
1860 Clear red . . .	,,	1800	299·70	2·760
2220 Clear orange . .	,,	2160	1159·00	2·883
2580 White, bright . .	,,	2520	4604·00	2·985

In this table, it is seen that, in the matter of radiant heat, as the temperature of the heated body or gas-fire is raised, the loss of heat from it into the room is immensely increased. To secure this in part, I would suggest burning the necessary amount of gas to heat any room in a smaller space than now, using burners (say) somewhat like the present high-pressure burners, or it might be a burner under ordinary pressure of somewhat improved form, to thoroughly mix the air and gas in proper proportions, to get a heat of greater intensity than at present, and gain some of the advantages stated in this table. This small fire would not only be more efficient per foot of gas used, on account of its intensity, but, owing to the smaller area of its back and sides, less heat would be conducted through them, to be lost up the chimney; and for the same reason less heat would be lost by the atmosphere impinging on the smaller fire, as it passed from the room to the chimney.

Cooking by gas is cheaper than cooking by a coal-fire. This, no doubt, has encouraged the hiring-out of gas-cookers. The cooker is in use both in summer and winter; and this being so, it is more remunerative in the way of consumption throughout the year than the gas-fire, which is only used during the winter months. Heating rooms by gas may be a little more expensive, fuel only considered, than heating by coal, with the exception of the case where the gas-fire is required only for a short time each day. Only one cooker is required, whereas two or more gas-fires might be hired-out for use in the same house. It is not to be expected that all these fires will be in use at the same time; and consequently the return in the gas consumption, together with that of the rental on the outlay of the gas authorities for each fire, would not be so large as the return on the outlay on a cooker. It would not be desirable to hire out to all and sundry highly finished and artistic fires. I would propose that these fires be offered to consumers on hire-purchase terms extending over five years. A few designs of a cheaper class of fire might be kept in stock, and these offered for hire at a reasonable figure, on the condition that the consumer would keep the fire for a certain period.

Discussion.

Mr. D. VASS (Airdrie) said that in Airdrie they had a hire-system for cookers for ordinary consumers; but for slot consumers a few

years ago he introduced the idea of giving free cookers, and the plan was very successful. About 80 per cent. of the consumers were found to be willing to take a cooker or a griller when they found that they had to pay no rent for it. In the old way, there was a payment of 1s. a year, in addition to the prepayment money for the gas; but it was impossible to get the 1s., and they were running into bad debt. This led him to suggest, when an opportunity offered of making a reduction, that they should not give a full reduction, but try to find out what it would cost to give free cookers. Lately they had canvassed the town to find out every non-consumer of gas; and they had made the proposals in the first place to the landlord that he should fit up the house—that was, where the tenant had agreed to take gas—or that the Corporation would fit up the house at cost price, or, if the landlord would have nothing to do with it, that he should allow the Corporation to deal with the consumer, in which case they would put in a slot-meter, making an extra charge of 6d. per 1000 cubic feet for five years, after which there would be no extra charge. Since the New Year, they had fitted up sixty houses which had pipes in, and between thirty and forty houses in which there were no pipes. They contracted with one of the local tradesmen, and so got over the difficulty of the trade saying that they were taking business out of their hands. Many years ago he tried the system of hiring-out gas-fires, as they were made then, on a hire-purchase system; but he found it was not a success. A fire would be sent back to them, slightly soiled—with the black rubbed off—and they could not get anyone to take it out again. He would strongly urge them to put the porcelain fires on the market, in the way of hiring; but they required to be carefully handled while they were being conveyed to the consumers' premises. They had introduced gas-steam radiators, and had this year already supplied between thirty and forty of them—mostly in business premises.

Mr. J. Campbell (Bo'ness) remarked that some people thought free appliances were not an unmixed blessing. When he was at Polmont, he charged 10 per cent. on the net cost, and had no trouble.

Mr. W. Brown (Lasswade) explained that one of the reasons why there had been such a success in Peebles with gas-cookers was that everyone who put in a cooker must put in a slot-meter; but there was no extra charge made for the gas. In his own case, he had no cookers nor gas-fires. He thought the public required to be instructed in the use of both cookers and fires.

Mr. J. R. Moyes (Edinburgh) considered it would be very easy to hire out gas-cookers for five years, in cases where the houses belonged to the hirers; but it would be sometimes awkward for a tenant to hire a cooker for five years.

Mr. J. W. Lill (Edinburgh) thought that until they could make people understand the merits of gas fires and cookers in comparison with coal, they would not make much headway; but once they got consumers to understand them, and manufacturers to make them properly, there would be gas cooking and heating appliances in every household.

Mr. H. Rule (Falkirk) was of opinion that, in view of the cry which had been raised about the rapidly diminishing coal supply, it behoved them to economize in the matter of using coal. There was no doubt that the method of burning coal in an open fire was a very wasteful one. He did not approve of putting in an ordinary burner where there was a coal-fire, because the greater proportion of the heat went up the chimney. They had a case of a 12-inch burner, which consumed fully 50 feet of gas an hour. It was costing 2d. an hour for heating. Gas-fires should be set out a little into the room, and be connected with the chimney by a flue. In this way they would get the benefit of the radiant heat. The use of radiators was really confined to large halls and public places where there was good ventilation.

Mr. J. Dickson (Kelty) said they should not claim any more for the article they sold than it was capable of doing. There was a great field for heating by gas. They had now high-pressure gas lighting; and it was almost certain that they would soon have high-pressure gas heating.

Mr. J. B. Scott (Cowdenbeath) referred to a strange experience he had in the matter of gas-cookers. They had an exhibition and demonstration, after which they managed to get about 70 cookers sent out; but this was with a struggle. Last year he advised the holding of another exhibition; and since then they had put out about 300 cookers. Why the demand had taken such a turn, he did not know. They charged about 10 per cent. on the initial cost for cookers in connection with ordinary as well as with slot meters. He had not been able to do very much in the matter of gas-fires, because the community was a mining one, and they obtained their coal very cheaply.

Mr. Waddell, in closing the discussion, said they could not afford to hire out a well-finished gas-fire, because when it had been in use for a time it suffered in appearance. He thought a hire-purchase system for five years would be right, because there were fires on the market of a general design which could be adapted to most fire-places; and a tenant removing to another house could take his fire with him. It did not pay them when a fire came back in (say) three months; and the hirers should be impressed with the idea that it was desirable they should keep the stove for a few years, and make reasonable use of it. He had seen fires fitted where there was no chimney in the room, and had never heard of any complaint with regard to them.

The President remarked that what Mr. Waddell had said to them fitted in very well with what they saw and heard on their recent visit to the works of Messrs. R. & A. Main, at Falkirk. The use of gas for cooking had made good progress, but as a source of heat for rooms much more might be done. Manufacturers were improving their gas fires and radiators; and if gas could be supplied at a cheap rate, quicker progress would be made. There appeared to be no doubt that, with reference to the condition of the atmosphere in large cities, the thousands of domestic fires were the greatest sinners. He moved a hearty vote of thanks to Mr. Waddell for his paper.

HOW CAN OXIDE OF IRON BE USED TO THE BEST ADVANTAGE FOR GAS PURIFICATION?

The discussion of this subject was then taken up.

Mr. J. B. Scott said he filled the boxes full, leaving little room for the passage of the gas, and gave the oxide plenty of time to revivify in the open air. Air was injected into the boxes; and good results were obtained from this system of working.

Mr. J. Dickson said his experiences were very much the same as Mr. Scott's. When he introduced oxide, he found that the purifiers showed foul about once a week, and this during the period of maximum consumption. He was working with Irish bog ore, which came in big lumps. At first the lumps were broken up; but then he imagined it might be better to leave them in their natural state. He thought that this would help the back-pressure; but he found that the gas was getting too easily through. However, after two or three foulings, the lumps got broken up, and the oxide was now in fine condition, and did its work much better. The oxide came with a good percentage of moisture in it; and he added moisture every time a purifier came off. He came to think that he had overdone this; but it was all right now.

Mr. J. W. Lill related that in a works where he was some years ago, bog ore was sent to them, and it would not work. It fouled in about eighteen hours. He asked what he should do, and was told to get some more oxide and mix with it. They did so, and had no further trouble. So far as he could learn, bog ore would not purify when it was new. They tried it later, as an experiment, and found that, after about three foulings, it worked all right.

Mr. H. Gourlay said that, when he started to use oxide, about fifteen months ago, he was troubled to get the gas to grip the oxide. He experimented, and found he was using it in too thin layers. He then took out the centre grid, and put in the oxide 18 inches thick. It worked well after this. Oxide he found to be a great ease to the men in the dead of winter, when they used to have tremendous bother with lime purification.

Mr. R. B. Waddell said the best way and conditions in which to use oxide had been pretty well dealt with. There was no doubt about the desirability of keeping the material in a moist and somewhat heated condition—not only for increasing the affinity of the oxide for the sulphuretted hydrogen, but also for enabling the gas to pass more easily through it than when the material had, for want of steam, become a dry cake, with at first sufficient interstices to allow the gas to pass pretty freely. But from observation it was found that it was just at this point that an increase of pressure took place. The cause was, without doubt, twofold—the very small particles of tarry matter still being carried forward by the gas were arrested at the mouths of the interstices, where the oxide dried and hardened, and in time tended to close up the interstices; and, again, small particles of the oxide got to a greater degree of dryness, and being unable longer to adhere to the mass fell into the interstices and filled them up.

Mr. D. Vass advised them to watch closely the Technical Press in connection with the subject. Some valuable papers upon the question had recently appeared. Purification by putting the second purifier first came from America; and he thought he and his assistant were the first to experiment with it. It was some time before they got at the right way to do it. They had to turn back the valve, not reversing the flow of the gas. This was the principle of putting on the second purifier first. Working with this scheme, he ran his purifiers for eleven months before changing. He could have run longer, but considered it desirable to see the inside of the purifiers at least once a year. There was no back-pressure, even after eleven months' working, which showed that the gas was getting through all right. Natural ore, on being first used, would not grip the gas, but allowed it to flow through; and what should be done was to get some other ore and either mix it or work it alongside for a time. It was sometimes advisable to get the material slightly alkaline for a little time, by passing the washer, or something of that sort.

The Hon. Secretary and Treasurer (Mr. John R. Moyes) read the report of Mr. A. Morton Fyffe, the Vice-President, on his attendance at the meeting of the representatives of the Junior Gas Associations in Birmingham, on Saturday, the 8th ult. Mr. Fyffe said: "As a result of the meeting, I feel the great need for co-operation, if the Junior Associations are to form a useful force in the profession. The English Associations seem to be ahead of us, both as regards enthusiasm and status; and the proposals now drawn up commend themselves to my hearty support." The Hon. Secretary also read the report made by the Secretary of the Conference.

Both documents were remitted to the Council for consideration.

SCOTTISH JUNIOR GAS ASSOCIATION.

WESTERN DISTRICT.

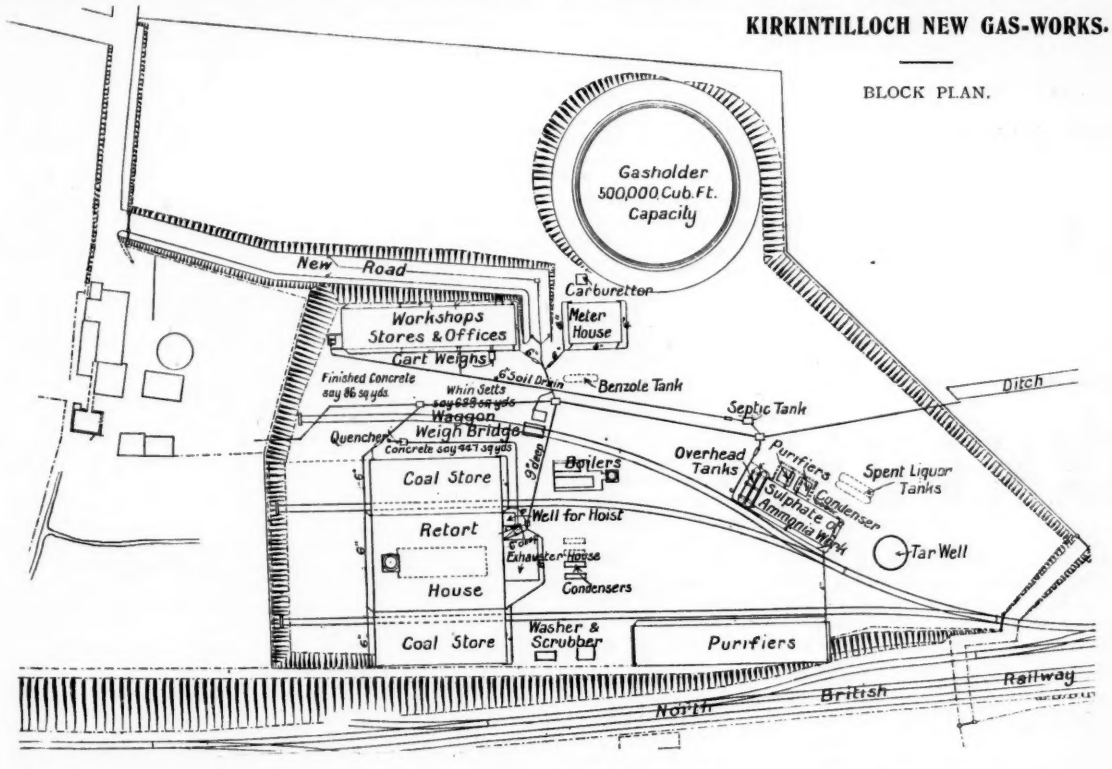
Visit to the Kirkintilloch Corporation Gas-Works.

The members of the Western District Section, to the number of about seventy, paid a visit on Saturday, the 29th ult., to the new Corporation Gas-Works at Kirkintilloch. The old works, which are still providing the gas supply for the district, are in the centre of the town, close beside the railway station. In this situation they are so hemmed in that extension was found to be practically impossible; and as they had reached their limit of production—60 million cubic feet—and as the growing demand for gas made it imperative that means for augmenting the existing provision should be found, the Town Council resolved two years ago, after deliberation, to erect entirely new works upon a fresh site. The one selected was on the southern outskirts of the town, by the side of the North British Railway, from which most convenient access has been formed, giving three lines of rails within the works—two into the coal stores, and one into the coke-yard; one of the former lines also serving the purifier-house. The new site is spacious, giving ample room for the extension of all departments, and affording plenty of air-space all about. It was on a slope, which necessitated a considerable amount of excavation; but the excavated material has been all required to make up the level of the lower portion—leaving room for further making-up, in time, by clinker and other refuse from the works. When the present Gas Manager—Mr. James M'Leod, formerly of Provan—went to Kirkintilloch a year ago, the ground plan of the works and the plans of the buildings had been fixed by his predecessor (Mr. W. Wilson, now of Falkirk), and the plating of the gasholder had been begun. It has fallen to Mr. M'Leod to deal with the introduction of all the other plant. The works are not yet completed; but they are expected to be ready for the production of gas within three months from now.

The retort-house, which is flanked by a coal-store on each side and the chimney, and the other buildings were erected by local tradesmen, who also constructed the roofing and did the plumbing and other work. All the buildings are of brick, and are covered with slate; the roof of the retort-house being of this material, tied upon iron by copper wire. The retort-bench, with all fittings, has been put up by Messrs. Robert Dempster and Sons, Limited, of Elland. The bench contains twelve ovens of eights, set back to back, six ovens on each side. The firing is on the full regenerator system; the under chamber being particularly roomy, to give the men ease and comfort in their work. For the removal of ashes, a hydraulic lift is provided as far as the level of the yard. The house has been constructed so that machinery may be introduced into it when found to be advisable; but at the present time, with the exception of the hydraulic lift for the ashes, there is to be no plant for mechanical stoking, nor for coal breaking, elevating, or conveying for either coal or coke. Governors are to be placed in the retort-house; but the fixing of them has not

KIRKINTILLOCH NEW GAS-WORKS.

BLOCK PLAN.



yet been reached—workmen at present being engaged putting up the ascension-pipes and hydraulic mains.

The condensers, of the upright atmospheric type, have been erected by Messrs. Clapham Bros., Limited, of Keighley. The exhausters, which are steam-driven, were made by Messrs. George Waller and Son, of Stroud. The set is a double one, each machine being capable of passing 25,000 cubic feet of gas per hour. The scrubber is by Messrs. C. & W. Walker, Limited, of Donnington. The purifiers, which are 20 feet square and 5 feet deep, have been erected by Messrs. Henry Balfour and Co., Limited, of Leven, Fife, and are fitted with Clapham's "Eclipse" rubber joints and Spencer's patent hurdle grids. The boxes are on the ground level; and the complete valve arrangement has been made so that everything can be easily got at.

The station meter has been furnished by Messrs. R. Laidlaw and Son (Edinburgh), Limited, and is of a capacity of 40,000 cubic feet per hour. It is intended to transfer the existing carburettor from the old works. A double-lift gasholder, of 500,000 cubic feet capacity, has been erected by Messrs. R. & J. Dempster, Limited, of Manchester. Its diameter is 120 feet, and its depth 24 feet. Two of the largest holders at the old works may be retained.

A steel tar-tank, 25 feet in diameter and 14 ft. 9 in. deep, has been constructed underground by Messrs. Hanna, Donald, and Wilson, of Paisley. All the tar will continue to be sold. Hitherto the ammoniacal liquor has also been disposed of; but in the new works sulphate-recovery plant has been installed by Messrs. C. & W. Walker. Above the exhauster-house there has been constructed a water-tank, capable of holding 100 tons of water for use in the works. This water is to be pumped from a neighbouring bog by a steam-pump; but eventually a centrifugal pump, driven by a gas-engine, may be installed. There is a fine range of offices and workshops flanking the road leading into the works.

The works are designed at present to deal with an output of 100 million cubic feet of gas per annum. Their cost has been about £30,000. They have been admirably laid out; and the general impression they convey is that internally, while there is extreme simplicity in all the arrangements, the different appliances have been well selected, and have been so placed that the works will be easy to supervise and to work. Everything lends itself to the belief that the Corporation have acted wisely in carrying through the transfer of the works to the new site.

The visitors were received at the railway station by Mr. M'Leod, Provost Service, Bailie Perry (the Convener of the Gas Committee), and several members of the Corporation. They walked to the gas-works—a considerable distance—through the snow that lay on the ground in a slushy condition, but which, on the slopes of the Campsie Fells, quite close by, was being whirled about in a powdery condition by a high gale. Having inspected the new works, the party returned and had a look at the old ones. They were afterwards entertained at "high tea" in the Parish Church Hall—Bailie Perry presiding.

The CHAIRMAN expressed the pleasure the Corporation had in having the Association at Kirkintilloch, and showing them their

new works, though as yet they were only in an embryo stage. He would personally like to see them paying a very great deal of attention to the question of chemistry in the manufacture of gas, as chemistry and engineering must go hand in hand. They would probably find in the future that the greatest economies in the manufacture of gas were to be realized through chemistry. Probably some of the town councillors were prouder of the old works than of the new ones, though the former were badly situated, on an acre of ground, without even a railway siding, and with no space for the carting of the coke and lime. Indeed, they had two cartages for the lime—first to a store outside and then to the works. They had done wonders in the old works; and they felt a certain amount of attachment to them. Two years ago, Mr. Wilson, their then Manager, and he (the Chairman) looked into the subject of all the works producing 50 million cubic feet of gas per annum; and they were very pleased to find that, though they were badly in need of new works in Kirkintilloch, they had the lowest-priced gas in the United Kingdom.

The PRESIDENT (Mr. W. Wilson) expressed the deep indebtedness of the members of the Association to the Town Council for their kindness in allowing them to see the works. The change there would be in the conditions of work in the new establishment as compared with the old one, was very apparent. They could see in their mind's eye how the manufacture of gas would proceed like clockwork on the new site. Kirkintilloch had progressed very rapidly during the last twenty years. He had seen the plan of the gas-works as they were originally; and from the books and minutes he found they had been continually altered to keep pace with the demand. When the Corporation came to the conclusion that they must build new works, they resolved that they must be large enough, and that it would be necessary to look ahead, notwithstanding that the prospect was marred by all sorts of statements about the inferior gas which was to oust them. He understood that Mr. M'Leod had had great difficulty during the past winter in meeting the demand for gas, owing to the congested condition and the smallness of the old works. He congratulated him on his success.

Provost SERVICE remarked that all that skill, science, brains, ingenuity, and experience could do, in planning the works and carrying them to completion, the Town Council had done; and he trusted that when they were finished they would be found to be the most perfect, of their size, in Scotland.

Mr. A. WILSON (Glasgow), on being called upon to make a few remarks, said he had several reasons for being present. He had some connection with the works before they were started. He went over the plans, and found that they had been so well thought out, and the works so well designed, that there was little left for him to do. He was able to assure the Town Council that what was proposed to be done was something they would be proud of in the future. Another reason he had for being present was that Mr. M'Leod was one of his old associaties. He thought he was to be sympathized with in having to put in his first year in the old works; but he (Mr. Wilson) did not know that he could have had a better training than he had had in works where makeshifts of every kind had to be adopted to keep things going. The Town Council were to be congratulated upon having taken the step they had; and the members of the Association were fortunate in having seen the new works while they were still in course of erection, because more was to be learned from them in that condition than would have been the case if they had been going and everything covered up.

DETERMINATION OF BENZENE IN GAS.

Some five years ago, Messrs. Dennis and O'Neill * described a method for determining the amount of benzene vapour in illuminating gas, depending on its absorption by an ammoniacal solution ot nickel nitrate, the accuracy of which appeared to be established by tests made of the method with coal gas containing known quantities of benzene. Since the publication of their paper, the method has been tried by other analysts; but whereas in some cases satisfactory results have been obtained, in others quite inaccurate figures have resulted. Recently Mr. D. A. Morton has shown that with mixtures of benzene and air, the ammoniacal solution of nickel nitrate has no greater absorbent action on the former than an equal volume of water, and that its absorbent power rapidly decreases as the amount of benzene taken up increases.†

Professor Dennis has therefore, in conjunction with Miss Ellen M'Carthy, subjected the matter to renewed investigation, the results of which were published in the February number of the "Journal of the American Chemical Society" (Vol. XXXIV., pp. 233-247). These authors have succeeded in showing that the absorption of the benzene by ammoniacal nickel nitrate solution only proceeds quantitatively when the gas contains hydrocyanic acid in addition to benzene; and the latter being then converted into the compound first obtained in 1897 by Hofmann and Küspert, having the formula $Ni(CN)_2, NH_3, C_6H_6$. As is well known, some samples of gas contain hydrocyanic acid, while others are quite free from it; and this fact probably accounts for the variation of the results obtained by different analysts—those who obtained accurate figures having, by chance, had to deal with gas containing hydrocyanic acid. Hempel and M'Carthy have also observed the somewhat unexpected fact that when coal gas is treated with caustic potash in the usual way for the absorption of carbonic acid, the whole of the hydrocyanic acid is not simultaneously removed; the benzene present having apparently a deterrent effect on the absorption. Having thus ascertained that the presence of hydrocyanic acid was necessary to ensure the absorption of benzene by the nickel solution, Hempel and M'Carthy next investigated the absorbent action of ammoniacal solution of nickel cyanide in place of that of nickel nitrate; and the results obtained appear to show that this forms a thoroughly reliable absorbent for benzene in gaseous mixtures, irrespective of whether or not these contain hydrocyanic acid.

For the preparation of the new absorbent, the following instructions are given: To 50 grammes of nickel sulphate ($NiSO_4,7H_2O$) dissolved in 75 c.c. of water are added 25 grammes of potassium cyanide in 40 c.c. of water. After the addition of 125 c.c. of ammonia solution of sp. gr. ·91, the mixture is shaken till the precipitated nickel cyanide has completely dissolved, and allowed to stand for 20 minutes at 0°C. The clear liquid is then decanted from the deposited crystals of potassium sulphate, treated with 18 grammes of citric acid dissolved in 10 c.c. of water, again allowed to stand at 0° for 10 minutes, after which the greenish-blue solution is decanted and introduced into a gas pipette. Two drops of liquid benzene are added to the reagent, and shaken till absorption is complete, requiring from two to three minutes; this last operation being necessary, inasmuch as the solution is somewhat sluggish until it has absorbed a little benzene.

The absorption pipette used by the authors was the Hempel pipette of the form employed for the use of fuming sulphuric acid as an absorbent, containing a second small upper bulb, 4 cm. to 6 cm. in diameter, which is filled with broken glass. In making the analysis, the gas, after the removal of the carbonic acid by potash in the usual manner, is repeatedly passed backwards and forwards for two minutes between the gas burette and the absorption pipette containing the ammoniacal nickel cyanide solution, and then into a similar pipette filled with 5 per cent. sulphuric acid to remove the ammonia taken up by the gas from the solution. The complete removal of the ammonia takes place somewhat slowly, and the gas must in this case also be passed backwards and forwards for two minutes. The residual gas is then subjected to the usual treatment for the determination of ethylene, oxygen, carbonic oxide, marsh gas, and hydrogen.

Check tests made by the method with mixtures of air and known amounts of benzene gave very good results, as will be seen from the following table:—

No. of Experiment.	Benzene Taken. Per Cent.	Benzene Found. Per Cent.	No. of Experiment.	Benzene Taken. Per Cent.	Benzene Found. Per Cent.
22	2·3	2·3	28	1·6	1·6
23	2·6	2·6	29	1·8	1 8
24	1·2	1·3	30	1·7	1·7
25	4·9	4·9	31	5·2	5·1
26	5·1	5·1	32	2·7	2·7
27	2·7	2·7			

Similar tests made with mixtures of ethylene and air showed that the former is quite unaffected by the reagent; and a further series of tests with coal gas, first freed from benzene and then mixed with known amounts of the hydrocarbon, gave equally satisfactory results to those obtained with air. These are given in the following table:—

No. of Experiment.	Time of Contact with Reagent. Minutes.	Benzene Taken. Per Cent.	Benzene Found. Per Cent.	No. of Experiment.	Time of Contact with Reagent. Minutes.	Benzene Taken. Per Cent.	Benzene Found. Per Cent.
55	2	1·1	1·1	64	2	0·9	0·9
56	2	2·8	2·8	65	2	1·1	1·1
57	4	0·8	0 7	66	2	1·3	1·4
58	8	0·8	0·8	67	2	1·3	1·3
59	2	4·3	4·3	68	2	1·4	1·4
60	2	2·7	2·7	69	2	1·2	1·2
61	12	2·7	2·8	70	2	1·0	1·0
62	2	0·9	0·9	71	2	2·6	2·7
63	2	0·7	0·7	72	2	3·6	3·6

Determinations by this method of the actual percentage of benzene contained in various samples of illuminating gas showed the presence of quantities varying from 0·5 to 1·3 per cent.

The only precautions required in using the method are those common to all in which large volumes of liquid absorbent are employed—viz., that the freshly prepared solution should, before use, be shaken with a sample of the gas to be analyzed, in order to saturate it with the slightly soluble constituents; and the same sample of aborbent should not be used for gas mixtures of markedly different composition. The gas-pipette holds about 200 c.c. of solution, and it was found that, even after 800 c.c. of benzene vapour had been absorbed, quantitative results could still be obtained. But as the above compound of benzene, ammonia, and nickel cyanide separates out in the solid state, it is well to change the reagent after it has aborbed from 200 to 400 c.c.

Mr. Morton, in his paper already referred to, proposes to estimate the amount of benzene by absorption with sulphuric acid of sp.gr. 1·84. According to Hempel and M'Carthy, however, this method is quite unreliable. They find that it does not give consistent results even when the conditions are kept exactly the same, and yields widely varying figures when the conditions are changed. Moreover, concentrated sulphuric acid has an absorbent action on ethylene as well as on benzene, and from gases containing both these hydrocarbons it does not quantitatively remove the benzene, but does remove an indefinite amount of ethylene.

* See "JOURNAL," Vol. LXXXIII., p. 369. † *Ibid.*, Vol. C., p. 711.

THE PROXIMATE CONSTITUENTS OF COAL.

The Pyridine Test.

At a recent Meeting of the Newcastle Section of the Society of Chemical Industry, a paper on the above subject was submitted by Professor P. Phillips Bedson. The full text of the communication is given in the current number of the "Journal" of the Society; and we now extract the portions which are of special interest to our readers.

The author began by saying that about eight years ago, in a note read before the North of England Institute of Mining Engineers, he drew attention to the remarkable solvent action of pyridine on coal. Subsequently, at his suggestion, Mr. J. Baker undertook the examination of the action of this solvent on different classes of coal; and the results of his investigation were communicated to the same Society.* The coals examined by him were four in number, and represented different classes of coal. A sample of anthracite from South Wales yielded practically nothing to pyridine, while from a bituminous coal—viz., that of the Hutton seam in the county of Durham, and sold as a gas coal, as much as 20·4 per cent. was extracted; another bituminous coal—that from the Brockwell seam in the same county, and one highly prized for its coking properties—gave an extract amounting to 11·5 per cent. of its weight. The fourth coal examined was one from New Zealand, resembling brown coal in composition, and, like the coals of that class, contained a considerable proportion of moisture. The loss in weight of this coal when treated with pyridine amounted to 21·4 per cent., which, when the water removed was deducted, represented an extract of coal substance of 5·65 per cent. The pyridine solutions were dark red to brown in colour, and in some instances exhibited a green fluorescent.

The extracts in each case were found to be rich in volatile constituents, and in the coking assay gave highly intumescent cokes; whereas the residues left after extraction were almost devoid of coking properties. In the case of the coking coal from the Brockwell seam, the portion insoluble in pyridine had not completely lost the caking power, but yielded a coke much less bulky than that left by the original coal. The author informed Dr. Carrick Anderson, of Glasgow, who had made a complete examination of the coals of the Scotch coalfields, of this action of pyridine, and in 1902 he published the results of an investigation of the coals of Bengal and Japan, in which he also gave an account of the results obtained by submitting these and also some Scotch coals to extraction with pyridine. In general terms, Dr. Carrick Anderson confirmed the experience of Mr. Baker and the author.

With the object of obtaining further information as to the solvent action of pyridine on different classes of coal, samples of six coals were procured from the Redheugh Gas-Works, through the kindness of Mr. William Hardie, the Manager, who also supplied the author with the average results obtained with these coals under actual working conditions in the gas-retorts. In the following tables are given the results of experiments, by Mr. Herbert Blair, at the author's request, as well as the proximate analyses of the coals, as made in the laboratory and also as deduced from the results obtained in actual working.

Four other coals, described as "cannels," were treated in the same way, as was also a sample of the Broxburn oil shale. The results obtained, together with those of the proximate analyses, are given in Table IV.

* See "JOURNAL," Vol. LXXVIII., p. 966.

TABLE I.—*Results obtained in Gas-Works.*

Mark.	Yield of Gas in Cubic Feet per Ton.	Illuminating Power of Gas in Candles.	Yield of Coke per Ton.	Percentage of Ashes in Coke.
A	11,381	16·63	13·55	8·53
B	11,392	16·50	13·51	8·92
C	11,646	16·40	13·73	8·50
D	11,108	16·00	14·25	7·80
E	10,913	16·39	13·36	10·80
F	10,730	15·76	13·29	15·12

TABLE III.

Mark.	Pyridine Extract.	Pyridine Extract. "Ashless Coal."	Volatile Matter. "Ashless Coal."	Volatile Matter.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.
A	32·36	33·86	35·69	34·10
B	33·59	34·93	34·60	33·28
C	24·58	26·80	34·78	31·91
D	22·81	24·08	33·47	31·70
E	29·97	32·42	36·39	33·65
F	22·53	24·43	33·48	30·87

TABLE IV.

—	Pyridine Extract.	Volatile Matter.	Fixed Carbon.	Ash.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Cannel coal	6·95	49·62	39·83	10·53
(Blaydon Burn)	8·31	37·43	56·28	5·91
(Canadian)	26·05	49·90	49·32	0·78
(Parkgate Seam, Barnsley)	28·90	34·37	63·52	2·11
Broxburn shale	1·59	29·70	0·51	64·79

In forwarding the samples, Mr. Hardie, speaking of the experience gained in gas-works, said: "None of the coals are really very bad; but the last are the worst two we get. We would call A and B good, C and D medium, and E and F bad." The author said that this conclusion was in the main borne out by the proximate analyses of the coals, as shown in Table II.; the proportion of volatile matter in E did not, however, justify its association with F. Again, from Table III., it was seen that the percentages of extract and of volatile matter were not far removed from one another, and if arranged in the order of the percentage of extract the coal E fell out of its order, just as it did when the coals were arranged according to the proportion of volatile matter. But such statistical consideration could, he added, be very readily pushed too far; and though the proximate assay of a coal was useful for many purposes, the information it afforded as regards the composition of a coal was, after all, not great. There appeared, at first sight, to be some approximation between the proportion extracted by pyridine and the volatile matter, as indicated in Table II., in which the numbers in the last line give the quotient of the percentage of fixed carbon divided by the extract, which approximated somewhat to the factor e/v. In the case of the cannel coals no such relationship was evident. But even in a series of coals which were industrially grouped together as "gas coals," it would, in the author's opinion, be futile to try to make any deductions from these numbers; for, as was known, identity in chemical composition was so frequently associated with differences in chemical behaviour and physical properties, that the problem was not a purely statistical one.

ABSORPTION SPECTRA OF BENZENE VAPOUR.

For a period extending over about thirty years, Dr. Walter Noel Hartley, F.R.S., of the Royal College of Science, Dublin, has been engaged in investigating and correlating the physical and chemical properties of aromatic substances in relation to their chemical structure or constitution; and he has latterly found it desirable that several very definite compounds should be examined in a state of vapour as well as in solution. In a paper read before the Royal Society, he gave the results of his examination of the vapours of benzene and several of its constituents at different temperatures and constant pressure, and at varying pressures with the temperature constant. The following is a summary of the paper and of the conclusions drawn by the author from his investigations.

As regards the vapour spectra, it is proved that benzene at 100° C. has the same molecular mass as at 25° or 12·7°. The absorption bands at 100° are almost identical with those at lower temperatures, with variations as to definition in the less refrangible

TABLE II.—*Proximate Analysis of Coals, based on Gas-Works (I.) and Laboratory (II.) Results.*

—	A.		B.		C.		D.		E.		F.	
	I.	II.	I.	II.	I.	II.	I.	II.	I.	II.	I.	II.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Moisture	..	0·79	..	0·68	..	..	..	..	..	..	..	2·62
Volatile matter	32·25	..	32·45	..	31·35	..	28·75	..	33·20	33·65	33·55	30 87
Fixed carbon	..	34·10	..	33·28	..	31·91	..	31·70	..	..	..	..
Ash	61·97	61·48	61·53	62·21	62·72	59·81	65·69	63·04	58·59	58·79	56·40	58 76
	5·78	4·43	6·02	3·83	5·83	8·28	5·56	5·25	7·21	7·56	10·05	7·75
Fixed carbon / Volatile matter	1·92	1·76	1·89	1·82	2·00	1·87	2·28	1·98	1·76	1·74	1·68	1·75
Fixed carbon C / Extract E	..	1·90	..	1·85	..	2·43	..	2·76	..	1·96	..	2·60

rays. The important influence of the position of the substituted hydrogens in benzene upon the number and position of the bands in the spectra of its homologues is clearly demonstrated.

Variations in the spectra of benzene at different temperatures and pressures are explained by the fact that there are two different kinds of absorption, which are sharply defined and may be differentiated. First, there is the general absorption, which is broadened and extended towards the less refrangible rays by rise of temperature; secondly, there is the selective aborption, which includes all the narrow individual bands and groups of bands. They are not widened and displaced by rise of temperature; and such changes of this nature as they undergo are the effect of the overlying general absorption.

The selective absorption is best studied by raising the general absorption to a maximum (at 100°), and studying the spectra produced by reduction of pressure. In this manner, any changes due to general absorption are eliminated. From the fact that increased sharpness and definition of the narrow bands is easily produced by rise of temperature, and also by reduction of pressure, the general absorption is clearly shown to be caused by encounters between the molecules; and the numerous narrow bands are to be ascribed to the vibrations of the atoms or atom-complexes within the molecules. This confirms the conclusion drawn from the study of solution spectra which were published in 1881.

The similar groups of bands occurring in benzene and toluene, and the close similarity between the spectra of toluene and ethyl benzene, with the further resemblance between *m*-xylene and toluene and ethyl benzene, is evidence that the mode of vibration within the benzene nucleus or ring-structure is in great measure unaffected by the side-chain substitution.

A distinction is drawn between the absorption spectra of vapours, called vapour spectra, and of solutions, called solution spectra, and the relationship of one to the other is explained. Previous investigations carried on by the author for many years are briefly referred to; and it is shown how the views entertained have been confirmed by the investigation of the vapour spectra. Attention is directed to the insufficiency of ordinary chemical formulæ to represent the constitution of organic compounds, particularly of those like benzene, which are of an endothermic character, since they do not take into account the distribution of energy in the molecule, and this obscures the view of the physical character or chemical structure or constitution. In short, whereas bonds and linkings in the formulæ usually written belong to a conception of chemical structure which is statical, the molecular constitution of such substances as are under consideration, when based upon the evidence derived from their optical properties, is essentially dynamical.

The relation of solution spectra to vapour spectra is shown by reference to the results obtained by Pauer, Hartley and Dobbie, and by Grebe. The view entertained by Baly and Collie, that benzene has seven and no more solution bands (indicative of a definite making and breaking of a double linkage of the carbon atoms in the ring), has been carefully examined; and the author finds this to be incompatible with well-ascertained facts. From the measurements and numerical relations of the wave-lengths of bands in solution and vapour spectra, it is explained how in the former four, six, seven, eight, or nine bands may be recognized, six of which are similarly constituted, and four of these are not only similarly constituted but very nearly of equal width, intensity, and persistency—that is to say, they have the same coefficient of extinction, and in all other respects an almost exact similarity. They correspond with four groups of vapour bands which are formed by the four different series of bands which overlap; and they occur where they overlap to the greatest extent.

West's Stoking Machinery.

West's Gas Improvement Company, Limited, have received a contract from the Gaslight and Coke Company for another large installation of stoking machinery for the Beckton Gas-Works. It is to be installed in the No. 8 retort-house at these works, and comprises compressed air charging and discharging machines, four lines of coal-handling machinery, eight large storage hoppers, &c., all to operate upon 30 benches of ten retorts. This is the fourth installation of West's stoking machinery which has been ordered in consecutive years for Beckton, and when completed there will be seven large retort-houses at these works operated by West's machines. The same firm have also in hand a large installation of compressed air machinery, coal-handling machinery, and regenerator settings for the Croydon Gas Company, and are just completing an installation of machinery for the Australian Gaslight Company, Sydney, for which Company they have supplied several installations in previous years. An important contract has also quite recently been entrusted to them for equipping the gas-works at Gothenburg (Sweden) with stoking machinery and coke-conveyors. The machinery in this case will be actuated by compressed air, and the coal and coke plants and air compressing plant will be electrically driven; the current being taken from the town's supply. The past year was the busiest in the annals of the Company, as, in addition to completing and putting into operation installations of their stoking machinery at Beckton, Cardiff, Mitcham, Warsaw, Copenhagen, and Aarhus (Denmark), they had in hand, and have now practically completed, large carbonizing plants for Milan and Tokio.

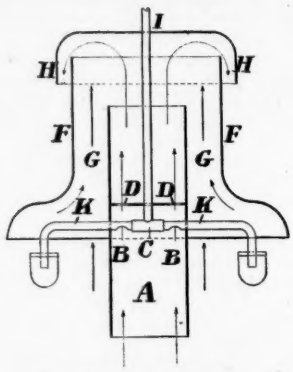
REGISTER OF PATENTS.

Inverted Incandescent Gas-Burners.

PÖSCHL, A., of Berlin.

No. 3706; Feb. 14, 1907.

According to this invention, the lamp (with one or more burners) is provided with a central suction-pipe in which the air and gas mixing-tubes with their air inlets are arranged, and supplied thereby continuously with a current of cold air, which, "through the heating of the upper part of the suction-pipe, is more powerfully conveyed than is the case with similar lamps hitherto in use."



Poschl's Inverted Burner.

On the gas-supply pipe I the distributor or junction piece C is seated, to which the burner and mixing-tubes K are jointed. The distributor and the openings B in the mixing-tube are surrounded by a suction-pipe A. The openings in the mixing-tube are on the underside; while above them is a plate, which is provided with openings D exactly over the openings B. The hot air ascends through the space G between the pipes F and A, heats the pipe A, and passes out between the cup H and the pipe F. In consequence of this heating of the pipe A and the forcing upwards of the exhaust gases by means of the air taken in through the pipe, a very powerful draught is obtained, and "thereby (*a*) the place where the distribution is effected and the nozzles are considerably cooled, so that, with the lamp burning a longer time, the increase in the consumption of gas is much smaller than hitherto, (*b*) the mixing-pipe that only opens downward at B receives a very powerful current of air that is forced into it, so that the mixture of air and gas is under a greater pressure and passes more quickly out of the mixing-tubes into the mantle."

Regenerator Setting for Vertical Gas-Retorts.

GLOVER, S., of St. Helens, and WEST, J., of Southport.

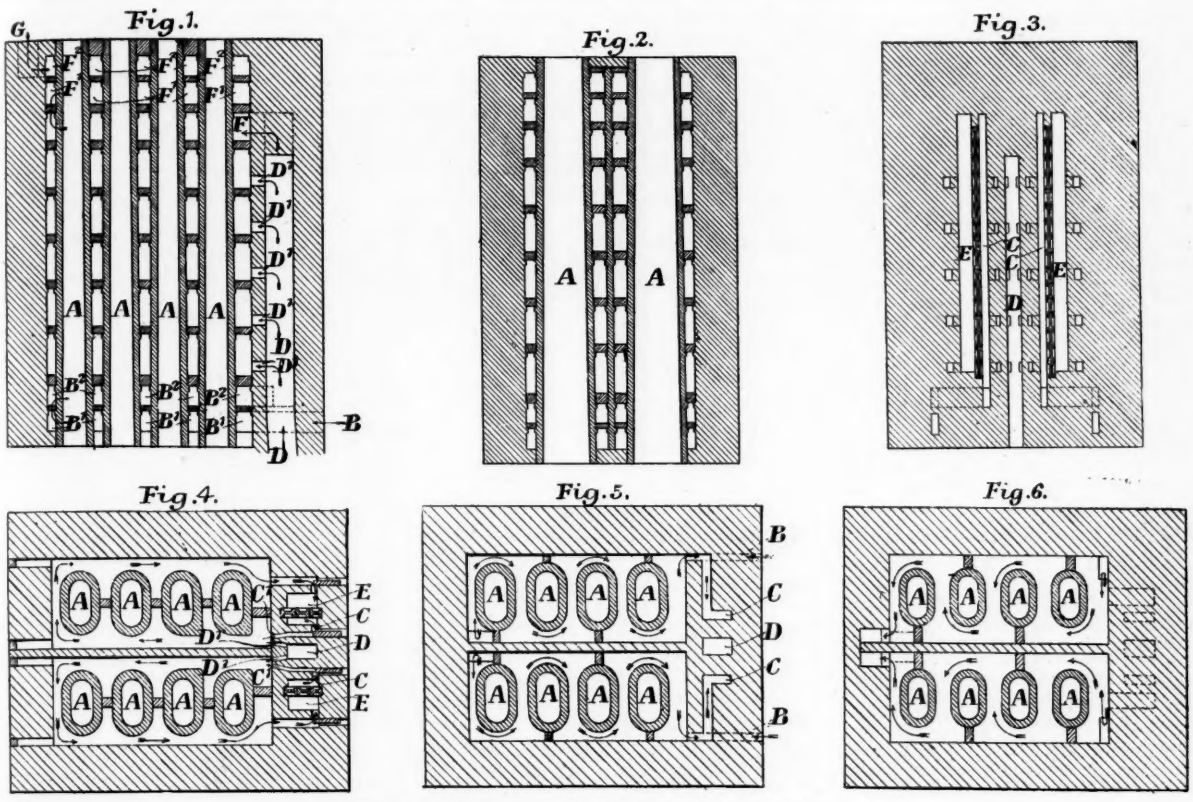
No. 2663; Feb. 2, 1907.

This invention consists in dividing the retort-setting by horizontal partitions into a number of separate and distinct chambers; the lower chambers around the lower ends of the retorts being arranged to heat the secondary air for the complete combustion in the other or upper chambers, and the upper chambers forming separate and independent combustion chambers.

In order to accomplish the heating of the air by the heat in the residual coke in the lower chambers, the air required for combustion is admitted into the lower chambers and brought into direct contact with the heated walls of the retorts—the heat of the retorts at these parts being derived from the hot coke in the retorts. Consequently the heat imparted to the air is extracted from the hot coke that would otherwise be lost, and the coke discharged from the retorts will be reduced in temperature, and the coke will enter the discharging receptacle in as cool a state as possible, "in order to reduce the wear and tear on the plant." This method of heating the air required for combustion by the heat from the coke may be supplemented by utilizing the heat of the waste products of combustion from the setting as is usual with regenerator settings.

In order to obtain complete control over the various points of combustion and the circulation of the resultant products of combustion in the separate and distinct chambers, each chamber is provided with slides or dampers for regulating the air supply, and also a set of slides or dampers for adjusting the extent of the combustion in each chamber and the distribution of the heat therein. At the upper ends of the retorts, an arrangement of chambers is constructed through which the products of combustion from the whole of the preceding chambers are allowed to circulate for the purpose of heating the upper ends of the retorts. Bye-pass passages formed in conjunction with these top chambers allow any proportion of the products of combustion to pass. At the outlets from the settings to the main flue to the chimney, dampers regulate the heat of the settings after the slides and dampers to each separate chambers have been set as required.

Figs. 1 and 2 are sectional elevations through a retort-setting showing the retorts and combustion chambers, also the regenerator passages, in section. Fig. 3 is a sectional elevation through the producer gas, secondary air supply, and waste-gas passages leading to the chambers at the top of the setting and thence to the chimney. Fig. 4 is a sectional plan through a combustion chamber, and showing the circulation of the products of combustion around the retorts. Fig. 5 is a sectional plan through the secondary air regenerator chamber showing the circulation of the air around the retorts. Fig. 6 is a sectional plan



Glover and West's Regenerator Settings for Vertical Retorts.

through the chambers at the upper end of the retorts, and shows the circulation of the waste gases around the retorts at this part of the setting.

A are vertical retorts arranged in any convenient number in each setting. B are the inlets for the secondary air supply (the courses of which around the bottom ends of the retorts and along the passages B^1 B^2 are shown by arrows); and after it has passed through these passages, it flows through outlets into the passages C, which are provided with inlet nostrils C^1 leading to each separate combustion chamber. The gas is conducted from the producer through the passage D, which is provided with gas inlet passages D^1 placed alongside the nostrils for the secondary air supply. The products of combustion circulate around the retorts and make their exit into the waste-gas passages, and ascend into chambers F, F^1, and F^2, and make their exit at G on their way to the chimney.

The air is heated primarily by passing through the chambers B^1 and B^2 and around the retorts, which at this point are filled with hot coke from which all volatile matter has been extracted. Consequently the air extracts the heat from the coke, which will become reduced in temperature on its way to the outlets at the lower end of the retorts. The air will be further heated when travelling up the passages C, which are built with thin walls separate from the adjacent passages E, through which the waste gas passes on its way to the top chambers F, F^1, F^2 to the chimney.

Coke-Ovens.

WILTON, G., of Mark Lane, E.C.

No. 3098; Feb. 7, 1907.

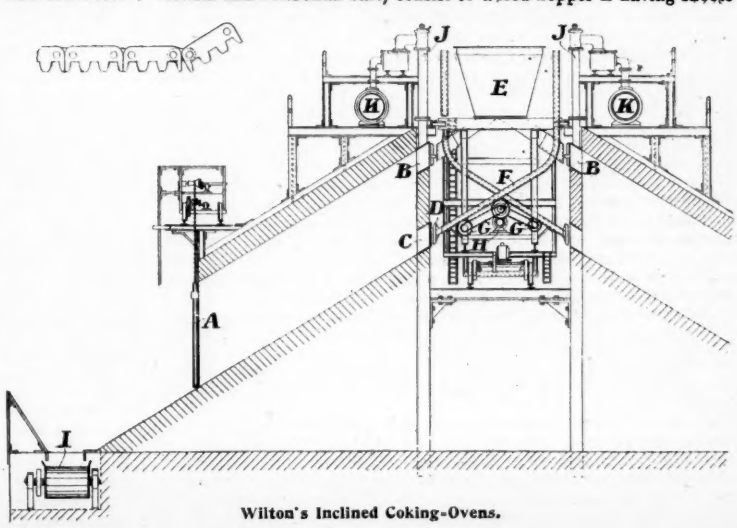
This invention relates to coke-ovens or retorts in which several tons of coal at a time are converted into coke in each, and where the retort or its floor is inclined for the purpose of enabling the oven to be charged from the uppermost corner, and also for allowing the whole mass of coke to slide out of the oven when the lower end is opened.

An oven made in accordance with this invention consists of an inclined coking-chamber of large dimensions, adapted to be opened for its full diameter at its lower or discharging end. It is also provided with a feed aperture at the uppermost corner or top of the end wall; and at the lower part of the end wall a pusher of relatively small dimensions is adapted when the mass of coke is to be discharged to push against it at the lower corner of the upper end of the oven—that is to say, at the upper end of the inclined floor. The whole mass is thus caused to slide out of the oven, and, owing to the inclination of the floor on which it rests, comparatively very little power is required from the pusher to accomplish the discharge. Also by the use of a pusher the floor need not be of such an inclination as if the mass were to be discharged entirely by its own weight; and the discharging door has not to bear any excessive weight of coke.

In one form, the ovens, arranged in rows, are inclined downwardly from a central raised gangway. The floor and roof of each oven are preferably parallel to one another, or substantially so; and the ends are substantially vertical—the longitudinal sections of the ovens being of rhomboidal shape. The outer and lower end is fitted with a door which is opened to the full cross section of the oven to allow of the whole mass of coke sliding out through it. At the upper end in the vertical end wall which adjoins the gangway, a charging aperture or hopper is provided at the top; and at the base of the vertical wall a door is provided adapted to allow of the insertion of the ejecting pusher or ram. In the gangway, travelling apparatus is provided, fitted at the top with a feeding hopper or devices of suitable kind, and at its base with the pusher-ram adapted to be inserted as described into the base of the vertical wall of each oven. The pusher may be in the form of a hydraulic plunger or ram, or it may be formed with an articulated stem adapted to be deflected to a vertical position in the travelling apparatus, and guided so as to be rigid when in use.

The manner in which the invention can be carried into effect will be understood from the illustration, which represents the chambers built in parallel rows on each side of a raised gangway. The floor and roof of the chambers are preferably parallel; and the floors are sloped at about the angle of repose of the charge. Vertically sliding doors are fitted to the outer lower end of each chamber; and these doors can be raised by hoists arranged to travel on rails along each row of ovens, and to be coupled to the doors as required by chains. At the upper inner end of each oven a charging aperture B is formed in the vertical wall; the apertures being normally closed by covers. Similar apertures C, covered by doors, are provided in the vertical walls for the expulsion of the charge by pushers D. These latter are carried by a travelling charging and coke-discharging apparatus mounted on rails in the gangway, so that it can be run along the gangway to the ovens as required by a motor mounted in the base of the apparatus.

The charging and discharging devices (supported by framing of vertical and horizontal bars) consist of a feed-hopper E having shoots



Wilton's Inclined Coking-Ovens.

leading at each side to the apertures B, and having vertically sliding end covers. The expulsion of the charges is effected by the pushers D, which are carried by rigid rods F extending (preferably) right up to the commencement of the curves shown, and attached at their inner ends to articulated stems composed of lengths pivoted together and travelling in casings which curve upwards to a vertical position; so that while the articulated stems can be diverted into a vertical direction they can travel rigidly. The rigid rods F and their linked extensions are formed, as shown, with rack teeth meshing with pinions G mounted in the framing and driven by chains from a countershaft by a motor H. The casings are cut away just above the pinions G to permit the racks and pinions to mesh; and the joints of the linked members are prevented from buckling upwards at these points by the shape of their ends (see detail), which are formed with abutting faces.

A travelling conveyor I may be provided at the base of the slope of the oven floors (as shown) or the coke may be discharged direct into trucks. J are the ascension pipes leading to the hydraulic mains K.

In the arrangement shown, the apparatus is adapted to charge or discharge two ovens simultaneously—one on each side of the gangway; but they can, of course, be charged and discharged in other ways without departing from the invention. The inventor says he finds that by arranging the ovens with inclined floors, a denser and better coke is obtained than with ordinary apparatus; also that by employing a combined travelling charging and discharging apparatus in the manner described, an important saving is effected in the time occupied in these operations and "the waste of residue gases is largely reduced."

Manufacture of Producer or Suction Gas for Use in Gas-Engines.

WILTON, G., of Mark Lane, E.C.

No. 3911; Feb. 16, 1907.

In plant for the production of the gas referred to as hitherto employed, the patentee points out, the washer or scrubber is usually in the form of a chamber or chambers packed with coke, through which water passes; and the water leaving the washer is run into the drain. This water is of a very objectionable nature; and the use of such plant has frequently had to be discontinued in consequence of the objections of local authorities. The inventor's object therefore is to so improve the operation of washing the gas that an effluent may be obtained which can be run into a drain without creating a nuisance. Moreover, an effluent may, it is said, be obtained of sufficient concentration to allow of its being sent to chemical works or treated locally for the recovery of the products; and at the same time an economy in washing water and a more efficient purification of the gas are secured.

The inventor proposes to add to the washing water passed through the scrubber oxide of iron, together with a salt of iron—such, for example, as sulphate. The oxide of iron serves to remove the sulphur from the gas, while the sulphate or salt of iron absorbs the ammonia. The quantity of oxide and salt of iron to be used may vary largely according to the size of the plant, the gas to be purified, and the character of the fuel. As "a very general example," he says he has found that an engine consuming a ton of coal a day would require about 20 lbs. of each per day.

The liquor or mixture leaving the scrubber is preferably led away and cooled by any suitable apparatus, and used over again until it becomes sufficiently concentrated, when a fresh charge of washing liquor or mixture as above is employed. The concentrated liquor may be treated for the recovery of bye-products, or it may be run to the drain; but in the latter case it is preferably not allowed to reach so concentrated a state as when it is to be treated for the recovery of bye-products.

As the mixture leaves the washer for cooling, it may be passed over a trap or weirs in the open air, or in apparatus arranged in any suitable way, so that the liquor or mixture comes into contact with the air, with the object of oxidizing the sulphides present and converting them into sulphur and oxide of iron, which latter, remaining in the liquor or mixture, will be again available for purification in the washer or scrubber.

For the purpose of the invention, the patentee prefers to employ a washer or scrubber of the bubbling hood type, as described in No. 13,787 of 1906, but may use any other form of washer.

Manufacture or Production of Gas.

TULLY, C. B., of Wood Green.

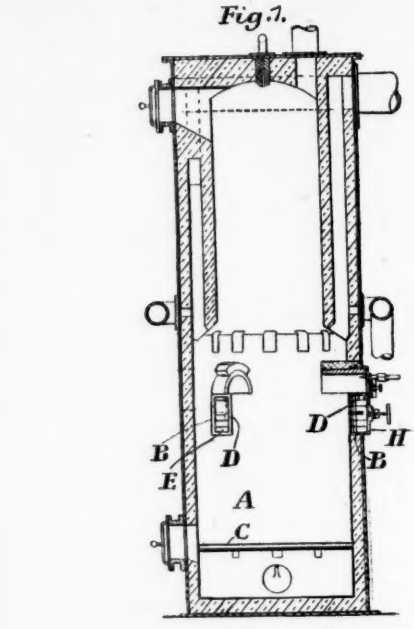
No. 3689; Feb. 14, 1907.

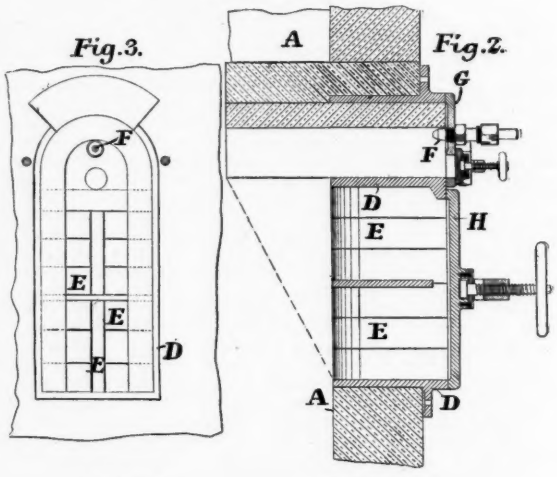
This invention relates to the manufacture of gas of the kind in which heavy liquid hydrocarbons (tar) are introduced into a gas-generator in the presence of a bed of incandescent fuel, and decomposed thereby.

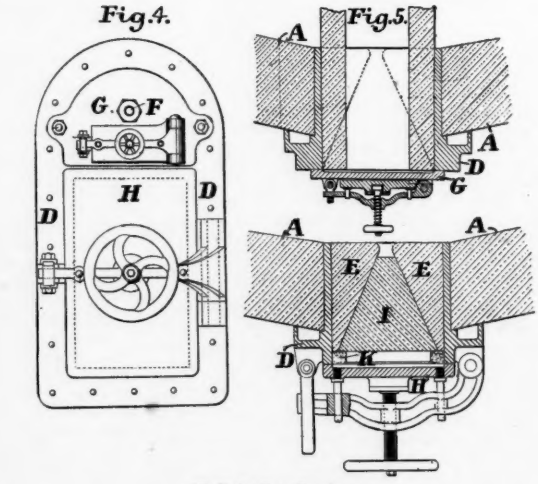
In practice, the patentee says, the points of introduction of the hydrocarbons to the generator have been variously located; but in all cases it has been found that at some period or other in the operation of the plant the liquid hydrocarbon is liable to become more or less carbonized and cause an obstruction or accumulation, which retards the continued introduction of the hydrocarbon and correspondingly decreases the efficiency of the plant. Also the construction of the generator has not permitted of the obstruction being observed, or, when observed, easily removed, as would be desirable.

The objects of the present invention are: (1) To so improve the construction of the chamber of the generator wherein the fuel is raised to incandescence and the hydrocarbon introduced and decomposed, that the latter shall issue into localized zones which are free of fuel, and, in consequence, less liable to become carbonized; (2) to enable the condition of the zones to be inspected at will, and any obstruction or accumulation removed; and (3) to enable the parts liable to deterioration to be readily renewed.

With each hydrocarbon nozzle there is combined a covering arch, or like device, which extends for some distance from the wall into the generator and constitutes a baffle for the superincumbent fuel, so that as it descends a space is ever present into which the hydrocarbon is sprayed by the nozzle—thereby reducing the resistance offered by the fuel to the admission of the hydrocarbon, enabling the hydrocarbon to be more or less gasified in the space so as to enter the mass of incandescent fuel in a more advantageous manner, and lessening the tendency for the nozzle to become choked. Above the arch is a fuel support—a brick or block of refractory material—carried by the adjacent part of the wall of the generator so as to somewhat relieve the arch of the weight of the superincumbent fuel. Beneath the nozzle and arch are inspection and clearing openings normally closed but capable of being uncovered to allow the state of the space referred to to be examined, and an instrument to be employed to remove any obstruction present.







Tully's Gas-Producer.

Fig. 1 is a central vertical section of the generator. Fig. 2 is a vertical section showing (to a larger scale) a portion of fig. 1. Fig. 3 is an interior elevation. Fig. 4 is an exterior elevation. Figs. 5 and 6 are horizontal sections of fig. 4—all corresponding to fig. 2.

In the arrangement shown, hydrocarbon is introduced at three points into a fuel-chamber A, cylindrical in cross section, with the axis

vertical. Three apertures B, arranged at 120° apart, are formed in the wall of the chamber at a convenient height above the level of the hearth C; the apertures being conveniently rectangular for the major part and surmounted by a semi-cylindrical portion. Within each aperture is fitted a frame D, of cast-iron, lined with fire-brick E or other refractory material. The lining of the upper semi-cylindrical portion may, as shown, be made separate from the other lining; being caused to extend or project inwardly into the fuel chamber and constitute the arch or projecting device forming one of the features of the invention. This arch may be of ⌒ shape in cross section. In this way, a localized zone or space, free from fuel, is formed below each arch into which hydrocarbon can be injected.

Each nozzle or tuyere F, by which hydrocarbon is introduced into the fuel-chamber, is carried, by a plate or door G approximating in shape, to the upper part of the frame and connected to it by bolts or hinges. In the example chosen, the plate is bodily removable and is provided with a hinged door retained by a pivoted bar which can be engaged with, and disengaged from, a pivoted catch or keeper and tightened, when closed, by a hand-wheel and screw which works through the bar and bears against the door when tightened up.

The lining for the lower part of the frame D is divided vertically by employing bricks dimensioned to leave centrally arranged slots between them, by which the contents of the fuel-chamber can be inspected, and through which a stirrer can be passed to agitate the fuel or lessen or remove any carbonized hydrocarbon or obstruction which may have formed in the space below the arch. The edges of the bricks adjacent to the slot or slots are chamfered off, rounded, or bevelled, so as to facilitate the manipulation of the stirrer. The slots are closed by a hinged or bodily removable door or cover H—the former being advisable, since the inspection may have to be frequently resorted to. The retention of the cover may be effected by a pivoted bar, which can be engaged with, and disengaged from, a pivoted catch or keeper and tightened, when closed, by a hand-wheel and screw, or their equivalent; the door being carried loosely from a pivoted bar by pins.

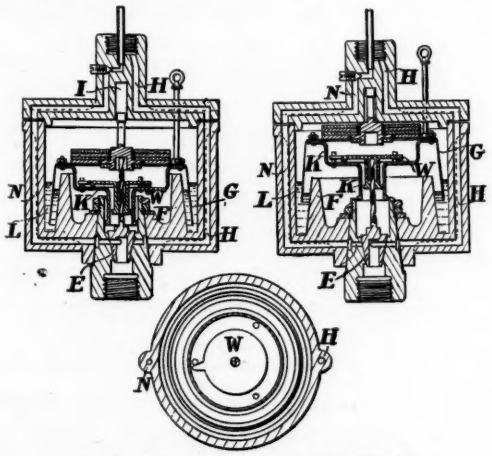
With the object of preventing condensation of hydrocarbon vapour on the inner side of the door, the slots may be normally closed by bricks I luted with clay K, or the like, as in fig. 6. Also, in some cases, the bricks closing the slots might be carried on the inner face of the door H.

Igniting Gas at a Distance.

MULLER, D., of Altenkirchen, Westerwald, Germany.

No. 27,814; Dec. 17, 1907.

This invention relates to a distant gas lighting device operated through variation of pressure and serving for lighting as well as for extinguishing the main flame and bye-pass flame respectively by means of a revolving valve. Its characteristic feature consists of a bell, actuated by the varying gas pressure, which bears in its operative position upon the rotating valve, which closes the gas-supply pipe in such a manner that the valve is securely pressed upon its seat, and afterwards released when the pressure is increased, so as to enable the bell to turn it by means of a screw spindle connected to the valve, and a nut controlled by the bell.



Muller's Gas-Lamp Igniter and Extinguisher.

The apparatus consists of a casing (with removable lid) provided with a screw-threaded pipe joint at the top for the main and bye-pass flame. On the bottom of the casing a regulating cone is concentrically mounted, to serve for regulating the device (according to requirements) for an evening or a night lamp. On the bottom of the casing is further provided a ring F, of such diameter that between it and the wall of the casing an annular space L is formed, which serves for the reception of a liquid in which the bell G is immersed. On the top of the bell a vertical rod is fixed, which is guided in the central boring I of the pipe joint. The bell G is connected by screws with an auxiliary bell K, which contains the device for operating the revolving valve E. The bell K is guided by means of a flange on its lower end in the cylindrical boring of the cone. In the centre of the cone the revolving valve E is arranged in the form of an inverted cone provided with a vertical boring and a horizontal semi-circular recess, the arrangement being such that, according to the position of the valve E, the gas either flows through the horizontal duct and orifice of the regulating cone and thence through the channel H to the main flame or through the horizontal boring orifice and channel N to the bye-pass flame.

The pipe for the bye-pass flame is fixed in the pipe joint at the end of the channel N, while the channel H terminates in the pipe joint, which is designed to engage with the pipe feeding the main flame. The revolving valve E has a duct at its top end which supports a vertical screw spindle that (passing through the lower part of the bell K) projects into the upper portion of the bell in order to serve as a support for the bell G when it is in its lowest position. On the screw spindle a disc W is mounted by means of a nut. The disc has a projection designed to engage with stops fixed on the upper face of the bell K at equal distances. On the upper surface of the bell G a vertical rod is fixed (guided in a hole of the cover), which is designed to prevent the bell from turning when ascending or descending. It also serves for operating the apparatus by hand. The weight of the bell is adjusted for different gas pressures by means of weights placed on the cover.

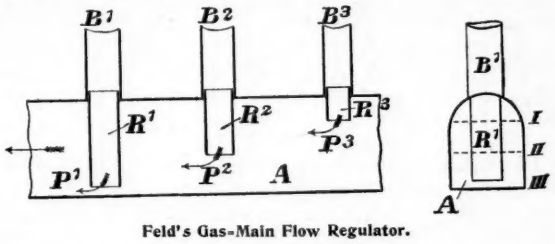
When the operative parts of the device are in the position first shown, the channel N for the bye-pass flame communicates with the main gas supply. The revolving valve is in such a position that the middle of its recess is in front of the orifice of the regulating cone, which orifice communicates with the channel N. The bell G is in its lowest position and rests upon the spindle of the revolving valve, which thus is tightly pressed upon its seat. When the gas pressure increases, the bell G, moving in a space which communicates with the gas-conduit, will be lifted. At the beginning of the ascending movement, the disc W rests upon the horizontal part of the bell K; so that the disc is prevented from rotating around the screw spindle. Thus the spindle, and with it the revolving valve, is forced to rotate. This rotation depends on the pitch of the threads of the spindle, and is calculated so that the revolving valve performs a turn of 120° when the movable parts of the device move from the lowest to the highest position. The revolving valve is thus turned to such a position that the channel N for the bye-pass flame is closed and the channel H for the main flame is opened. During this revolution, both channels are for a moment simultaneously connected with the main gas supply through the semi-circular recess, so that the bye-pass flame can light the main flame. When the increased pressure is again reduced, the bell G descends from the second position shown to the first position. The disc W does not participate in the descending movement, as it is prevented from revolving on the spindle by the pin; and only after the bell has sunk so far that the projection is free from the pin can the disc rotate on the spindle and descend. When the pressure is again increased, the operation described above is repeated; and the revolving valve is displaced, so that the channel N is closed and the channel H for the main flame is opened. Only a further increase of pressure causes the revolving valve to close the channel H, and the channel N for the bye-pass flame is opened again.

Regulating the Pressure of Gases Flowing through Flues or Mains.

FELD, W., of Hönningen-on-the-Rhine, Germany.

No. 6821; March 21, 1907.

The patentee points out that hitherto the inflow or outflow of gases has been regulated by altering the cross-sectional area of the inlet or outlet passage by means of cocks, valves, or dampers; but the regulation thus effected is not accurate. But he has found that more accurate regulation is obtained if the pressure of the gases be altered without altering the cross-sectional area of the passage or passages; and this he proposes to effect by altering the level of the inlet or outlet openings.



Feld's Gas-Main Flow Regulator.

The illustration shows, in sections at right angles to each other, an arrangement in accordance with this invention as applied to the passages for gases from coke-ovens into a main flue. Here the regulation is effected by making the outlets open at varying levels into the main flue—for example, by means of pipes R^1, R^2, R^3, the cross-sectional area of which remains unaltered, the regulation being effected by the adjustment of the pipes longitudinally of themselves. As all the coke-ovens are required to work evenly, the quantity of gases from each oven must be the same; and therefore, to obtain accurate results, the outlet conditions must be the same. The passages from the ovens are arranged in such a way that the outlet from the passage nearest the chimney discharges into the main flue A as low down in it as possible, and so on. The outlet from the passage farthest from the chimney is as near the arch top or roof of the main flue as is convenient; the intermediate outlets being at intermediate heights, so that the gases from the several passages pass in layers throughout the flue in accordance with the positions at which the pipes open into the flue. For example, the gases from the outlet B^3 pass in the layer I., the gases from the outlet B^2 pass in the layer II., and the gases from the outlet B^1 pass in the layer III., without restriction of the cross-sectional area of the passages. By this means, the ovens are regulated by the outflow pressure of the gases passing from them into, and along, the main flue. The relative pressures from the several outlets can be regulated by altering the effective lengths of the pipes R in any convenient way, or by altering the position of the outlet ends of the pipes B themselves, if they be continued down into the main flue instead of having pipes such as R added to them.

The arrangement is practically the same if several gas-outlets be branched away from the main flue; and by the adjustment of the outlets the outflow pressure of the gases in the several outlet pipes or passages can be equalized, or altered, without altering the cross-sectional area of the pipes or passages.

Lutes of Telescopic Gasholders.

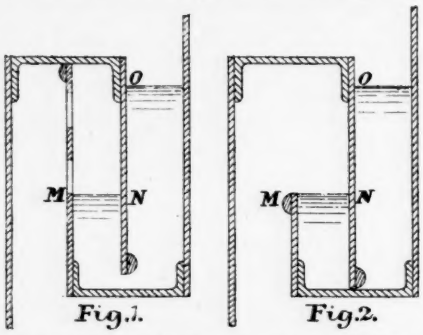
Scott, J. W., and R. & J. Dempster, Limited, Manchester.

No. 10,900; May 10, 1907.

These improvements relate to the cups and dips forming the lutes of telescopic gasholders, with the object of preventing the overflow of excess water from them externally on to the lift of the holder as at present.

In ordinary gasholder lutes, the patentees point out, the cup rim of each inner lift is formed approximately of the same depth as the dip rim of the engaging lift, whereby the level of water at the outer part of the lute is, by pressure of the gas within, maintained at or about the maximum height. Thus the further addition of water (such as rain water, or water from the condensation of steam used to prevent freezing in the lutes, or hot water circulation for the same purpose) causes an overflow down the exterior sides of the holder, which may cause soiling or disfigurement, and, "in cold climates, produces an accumulation of ice thereon, which may seriously interfere with the telescoping action of the lifts, or with the safety or efficiency of the holder in other ways."

To overcome this evil, the cup rim is made shorter or shallower than the dip rim, or, alternatively, the upper portion is formed of a fully extended cup rim with openings for the escape of water through it. The water-enclosing portion of the cup rim in any case terminates at such a distance from the top of the dip as to permit space (with a margin of excess) for a column of water in the outer part of the lute having a pressure equal to the pressure of gas in the holder. By such means, it is said that the outer column cannot be added to without overcoming the gas pressure sufficiently to cause an internal overflow over the top of the cup rim or through the openings in it.



Scott and Dempster's Lutes for Telescopic Holders.

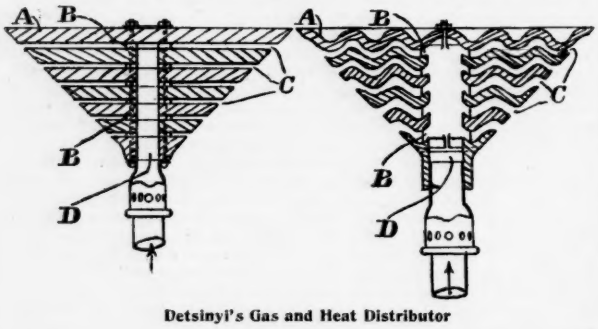
The illustration shows two sections through the lute at one side of a gasholder. In fig. 1, the cup rim is carried to the top of the dip, but formed, beyond the point M, of more or less openwork construction, so that the level of water cannot rise beyond this point. In fig. 2, a shallow cup rim without extension is shown, as a modified form of the invention. Assuming that the column of water N O in the outer part of the lute has a pressure equal to that of the gas in the holder, it will be seen that the level of water on the inner side of the dip plate will be maintained at M N, which is the maximum height at which water can be contained by the cup rim. Any rise of the level at O, therefore, will cause an overflow at M; and thus there will be no external overflow as heretofore.

Distributing Gases in Burners for Lighting and Heating Purposes.

Detsinyi, G., of Berlin.

No. 20,301; Sept. 11, 1907.

An important factor in incandescent gas lighting (the patentee remarks) is the extent of the incandescent surface. The emission of light, other conditions being equal, is proportional to the same; and, according to his invention, this is obtained by a special mode of distributing the gases of combustion as shown in two arrangements, in the first of which the plates are flat, while in the other they are corrugated.



Detsinyi's Gas and Heat Distributor

The gases are led between narrow slits C of plates A arranged closely above one another to the outer surfaces of the plates, where they are ignited. On the slits formed by every two plates flame rings are formed, which make up a flame mantle. The supply of the gas is effected through a passage D in the centre of the plate, or through several passages pierced through the plates.

The slits or crevices between the plates can either be formed by notches or grooves in the plates or in suitable refractory supports B, which maintain the correct distance of the plates from one another without materially hindering the free flow of the gases. All the plates may be of cylindrical or prismatic form, or in the form of an inverted cone, or they may be of inverted pyramidical form, or a hemisphere or an ellipsoid.

The plates are made of badly conducting material, so that the heat given out to them by the flame will not be withdrawn without leaving the heat necessary for causing the incandescent body to glow.

It is particularly advantageous, the patentee says, that the outer surfaces of the plate form an inverted conical surface, "so that the most powerful rays of light given off perpendicularly from the conical surface will be directed downwards."

This mode of distributing the combustion gases in the burner—in particular with a downwardly directed conical form of the outer surfaces—is said to be especially suitable for heating rooms, because in this case the flame rings are directed against the projecting cone surfaces extending at an angle above and lick and heat these much more, and the heat rays are much more intensely thrown off in a downward direction by this surface where the heat is most necessary.

APPLICATIONS FOR LETTERS PATENT.

3567.—West, J., "Conveyors and elevators." Feb. 17.
3593.—Wigley, P., Arculus, G. N., and Warry, J., "Regulating bunsen burners." Feb. 17.
3603.—Geipel, G., "Economizing consumption of gas." Feb. 18.
3611.—Haworth, J., and Hargreaves, P., "Acetylene apparatus." Feb. 18.
3613.—Naylor, G. W. & J. F., "Pipe joint." Feb. 18.
3646.—Robinson, J. A., "Prepayment meters." Feb. 18.
3649.—Spencer, W., "Purifier grids." Feb. 18.
3696.—Hanwell, H. W., "Pendants." Feb. 18.
3747.—Robin, J. I., "Mantle boxes." Feb. 19.
3768.—Glover, T., "Coin-freed apparatus." Feb. 19.
3779.—Spencer, A., "Controlling the supply of gas." Feb. 19.
3785.—Laigle, R., "Mantle filaments." Feb. 19.
3811.—Booth, J., and Simpson, R. J., "Suspended gas-lamps." Feb. 20.
3814.—Arculus, G. N., and Warry, J., "Holding globes." Feb. 20.
3899.—Royle, J., and Darbyshire, J., "Gas-lamps." Feb. 21.
3931.—Mavor, H. A., and Main, A. P., "Radiators." Feb. 21.
3932.—Mayor, H. A., and Main, A. P., "Condensing vapour carried by waste products of combustion." Feb. 21.
3947.—Lines, A. A., "Gas-fittings." Feb. 21.
4007.—Hislop, G. R., "Utilizing heat of waste gases." Feb. 22.
4008.—Hislop, G. R., "Heating by gas." Feb. 22.
4009.—Hislop, G. R., "Utilizing heat of waste gases." Feb. 22.
4073.—Broad, C. C., "Pressure-regulators for burners." Feb. 24.
4076.—Beckett, G. A., "Acetylene generators." Feb. 24.
4094.—Izzett, J., "Regenerative gas-furnaces." Feb. 24.
4156.—Smith, W. D., "Gas-fires." Feb. 24.
4203.—Vincent, G., "Air-gas generators." Feb. 25.
4208.—Lewis, F. A., and Pike, R. S., "Gas-lamps." Feb. 25.
4261.—Marks, E. C. R., "Automatically controlling the temperature in buildings." A communication from the National Regulator Company. Feb. 25.
4266.—Parker, T., "Distillation of coal." Feb. 25.
4308.—Hislop, R. F., "Lifting carriages for purifiers." Feb. 26.
4346.—Steinkrüger, F., "Cocks and taps." Feb. 26.
4415.—Helps, G., "Gas lamps and burners." Feb. 27.
4428.—Shipwright, W. G., "Connection joint and union." Feb. 27.
4451.—Graetz, M., "Gas-nozzles for inverted burners." Feb. 27.
4461.—Michaud, G., and Delasson, E., "Filaments for illuminating and heating purposes." Feb. 27.
4492.—Blakeley, W., "Producer gas plants." Feb. 28.
4520.—Sunnucks, G., "Mantle supports." Feb. 28.
4529.—Maly, J., "Gas-generators." Feb. 28.
4549.—Graetz, M. and A., "Inverted lamps." Feb. 28.
4550.—Hill, A. J., and Mann, F. C. D., "Electrically igniting gas-burners." Feb. 28.
4556.—Steinforth, R. J., and Hardy, E. P. L., "Taps or cocks." Feb. 28.
4558.—Kreissle, X., "Acetylene generator." Feb. 28.
4572.—Keyte, G., "Guide-wheels or guide-rollers of spiral guided gasholders." Feb. 29.
4605.—Keith, J. & G., "Diaphragm governor for high-pressure gas." Feb. 29.
4623.—Small, F. J., "Locking tap for mains." Feb. 29.
4636.—Felchlin, A., "Gas-burners." Feb. 29.
4652.—Barber, G. H., and Barrett, S. R., "Inverted burners." Feb. 29.

Torquay Water-Works.—At the meeting of the Torquay Town Council last week, the estimate of the expenditure on the water-works for the ensuing year was considered. The accounts for the present year ending the 31st of March were expected to show a debit balance of £607, compared with a debit balance of £3305 on the 31st of March last year. For the year ending March 31, 1909, it was estimated that the income would be £17,961, and the expenditure £17,257. The debit balance would therefore be extinguished and a credit balance of £97 established. Mr. Crocker, the Chairman of the Committee, expressed the hope that next year some of the extra charges for the use of water, which were found to be irksome and irritating, would be taken off. The Water Engineer (Mr. S. C. Chapman) reported that he had made the usual calculations for ascertaining the actual capacity of the Trenchford reservoir, from which it appeared that this was 171,690,000 gallons, instead of the estimated capacity of 200 million gallons. Some of the members expressed disappointment on learning that the reservoir was 15 per cent. less than its estimated capacity. Mr. Chapman said he did not know how his predecessor arrived at his figures. Mr. Pike explained that it was a matter of contour, and an error had been made in not allowing for unfavourable points where capacity would be lost.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

The Founders of the Midland Association of Gas Managers.

SIR,—My friend, Mr. William North, is doubtless right in his recollection of that first meeting at Windsor Street; but it is due to another very old friend, Mr. John Tindall—who I am sorry to note was unable to attend the meeting last week—to say that I have always had it in my mind that it was he who first mentioned to me the idea of forming a District Association. This was during the meeting of the then British Association of Gas Managers at, I think, Bristol, in June, 1877. The meeting to which Mr. North refers took place later in the same year. My reply to him, after giving the matter consideration, was that, provided I was assured of a general desire for the formation of such an Association, I should be willing to assist. In this way, the ball was set rolling.

May I take this opportunity of again thanking the members of the Midland Association for the great honour they have done me in electing me as one of their honorary members—a distinction which I prize the more because I share it with veterans who have done strenuous and enduring work for the gas industry.

17, *Victoria Street, S.W., March* 7, 1908. CHAS. HUNT.

De Brouwer Stoking Machines.

SIR,—In my remarks at the last meeting of the Midland Association at Birmingham, I hardly did justice to the De Brouwer machines when giving our average make of gas at 5500 cubic feet per mouthpiece. This figure is correct so far as it goes; but I should have stated that this is the average make for all the retorts in action, which includes 288 small 18 inch by 15 inch ⌂ section direct-fired retorts at our Litchurch works, and 96 retorts, 21 inch by 15 inch, at Cavendish Street works—all of which are at present drawn and charged by hand.

When all the small direct-fired retorts are out of action and the whole of the carbonizing is done by the "D.B." machines, the average make per mouthpiece is then from 6500 to 7000 cubic feet per diem, which, for unscreened and small Derbyshire coal, is not bad working. When we use high-class Yorkshire coal, the make per mouthpiece immediately jumps up to about the figures given by other speakers; and it should be borne in mind that all our retorts are only 9 feet long, compared with the usual 10 feet.

It is simply a question of the class and kind of coal carbonized.

By replacement of the small direct-fired hand-charged retorts, we have doubled our gas production upon the same floor-space by means of gas-fired regenerative settings worked with "D.B." machines.

Derby, March 7, 1908. J. FERGUSON BELL.

Disposing of Fouled Water from Gasholder Tanks.

SIR,—More than twenty years ago, when the Schaffner and Helbig sulphur-recovery process was in operation at a large chemical works in the Midlands, the sulphuretted hydrogen generated by the process was stored in one of the coal-gas holders set aside for the purpose. The smell from the impregnated water in the tank became very objectionable—even in a chemical works; and oil was put on the top of the water to the depth of about 1 inch, which stopped all the smell most effectually.

This was a suggestion of the late Sir Frederick Abel (the expert on explosives); and, my only object in mentioning it is to make it clear that the idea did not come from America, and is not a modern one.

March 7, 1908. GAS MANAGER.

Peebles and Co., Limited.

SIR,—The remarks contained in "Notes from Scotland" in your issue of the 3rd inst. with reference to Messrs. Bruce Peebles and Co., Limited, are a little misleading, and may give the impression that this business is still carried on as a department of that concern. We have already (in your advertisement columns) drawn attention to the purchase of the gas-meter and gas-governor business by this Company, but shall feel obliged if you will insert this letter to correct the wrong impression your Correspondent's paragraph may give.

PEEBLES AND CO., LIMITED,
B. Sutherland, Secretary.

Edinburgh, March 6, 1908.

Use of Hydrants without Payment.

SIR,—I was pleased to see Mr. Coster's letter on the above subject in your issue for the 3rd inst., and with him regret that my invitation for information met with no response; but perhaps the difficulty has not previously arisen in actual practice. In reply to his inquiry, I may say that, as no one is prepared to pay for the use of the hydrants, it is intended to remove them.

March 5, 1908. WATER-WORKS.

Lighting of Burwash.—Last week, in a room at the Bear Hotel, Burwash, a gas exhibition and cookery lectures took place, to commemorate the opening of the new gas-works of the Robertsbridge, Salehurst, and Hurst Green Gas and Water Company. Dr. W. R. White, of Wadhurst, who presided at the opening lecture, pointed out that the new gas-works were centrally situated, and said the Company hoped in time to do away with the other works, and serve the whole district from Burwash. The charge for supplies by ordinary meter is 5s. per 1000 cubic feet; while slot-meter users will receive 14 cubic feet for 1d.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following further progress has been made with Bills:—

Bill read a second time and committed: Bognor Gaslight and Coke Company Bill.

Bill reported: Huddersfield Water Bill.

The Audenshaw and Saddleworth Urban District Councils Bill, Briton Ferry Urban District Council Bill, Pontypridd Water Bill, and Skegness Urban District Council Bill have been referred to a Select Committee, consisting of Lord Clinton (Chairman), Earl Fitzwilliam, Lord Dormer, Viscount Iveagh, and Lord Ritchie of Dundee; to commence sitting to-day.

The Earl of Eldon has replaced the Earl of Cranbrook, and Lord Belhaven and Stenton the Duke of Montrose (Earl Graham), on the Select Committee appointed to consider the Llanelly and Swansea Valley Gas Bills.

HOUSE OF COMMONS.

In the House of Commons last Thursday, a Bill "to confer further powers on the Camborne Water Company for the raising of capital, and for other purposes" (a late Bill for the introduction of which the Standing Orders had been suspended), was presented, read the first time, and referred to the Examiners.

FINCHLEY URBAN DISTRICT COUNCIL BILL.

Court of Referees.—Wednesday, March 4.

The Court of Referees of the House of Commons, presided over by Mr. J. CALDWELL, Deputy-Chairman of Committees, considered to-day the claims of the Barnet District Gas and Water Company, the Southgate and District Gas Company, and the North Middlesex Gas Company to be heard in opposition to the Finchley Urban District Council Bill, when it comes before a Select Committee of the House of Commons. Sir D. BRYNMOR JONES, Mr. W. P. BEALE, and Mr. ERNEST MOON, K.C. (Counsel to the Speaker) were also present.

Mr. A. M. PADDON, on behalf of the Barnet Company, said his clients' petition applied exclusively to the electric lighting portion of the Bill—Part II.—which proposed to extend the electric lighting powers of the Council beyond their administrative area into a district in which the Company had now exercised statutory powers for very many years. The proposed incursion into this area was absolutely new; and it would create new competition. The Council asserted that the area into which they proposed to extend was infinitesimal, and that there would be no such competition as, according to the practice of Parliament, would entitle the Company to be heard. The Company, however, did not regard the matter as infinitesimal. Their revenue would be affected to the extent of £250 per annum. If the Company did not obtain *locus* with regard to the new competition in the extended area, in the case of any future and more important extension, the Council would say they obtained an extension of area in 1908 without the Company being allowed *locus*, and that therefore the Company had no right to appear on the later occasion. The revenue of the Company was £12,000, from gas and water together. He contended that the use of the word infinitesimal, if allowed to stand, would destroy a principle and divest the Company of power to deal with the matter in future. In clause 11 the Council took power to lay electric services in streets not dedicated to the public use. At present, both the Council and the Company could not lay mains in such thoroughfares; and if one of the two was released from this disability, a variation was made which would operate against the other. There would be a most drastic form of competition, which it would be very hard to deal with. The Company were removed altogether from the category of the ordinary ratepayer, because, while being the second largest ratepayers in the district, they had no voice under the Borough Funds Act with reference to restricting the expenditure of the rates.

Sir R. LITTLER, K.C., on behalf of the Southgate and District Gas Company, contended that clause 11 by itself justified his clients being heard against the whole of the electric clauses, because it undoubtedly gave to the Council a distinct advantage as regarded existing competition. By this clause the Council sought to be empowered, on the application of the owner or occupier of any premises abutting on, or being erected in, any street not dedicated to public use, to supply such premises with electric energy. Such power would enable the Council, notwithstanding the objection of anybody in the street, to lay down their mains; while his clients would not possess similar power. Obviously in such a case the Company would be crippled, not only now, but for all time; and the number of these streets was legion. Whatever might be thought of competition in the new area, the Council would have a power in these non-dedicated streets which would mean unquestioned loss to the Company. The Council had an unprofitable concern; and they were seeking advantages which would make it profitable at the Company's expense. If the Council proposed that not only they but the Company also should have power to lay mains in these streets, the objection might be met. The present proposal would do the Company an injury; and therefore, quite apart from the question of competition, they had a right to *locus*.

Mr. MOON: You can supply in these streets by agreement?

Sir R. LITTLER agreed. He pointed out, however, that if the people at (say) No. 11 were taking electric light and the residents at No. 13 asked for a supply of gas, the people at No. 11 would probably object; and in that case the Company would be unable to give a supply to No. 13. The total assessable value of the premises within the Council's district was £218,818, and the total indebtedness of the Council

£343,139, in which was included £75,660 borrowed within the last five years for purposes of the electricity undertaking. The Council had already obtained sanction to borrow £86,960 for the purposes of the electricity undertaking, and now sought to borrow £22,000 more for the same object—making £108,960. The revenue account for the year ended March, 1907, showed a loss of £712; and in this account no provision was made for depreciation of plant and machinery otherwise than the inclusion of certain unimportant items of maintenance and repairs. As the law now was, the Company differed from the usual ratepayers in the district. The ordinary ratepayer was bound by the common seal of the Council, because he was represented on the Council. The Company were not so bound, as they were not, and could not be, represented on the Council, inasmuch as they had not a vote. In addition, while the Council did not compete with any of the ratepayers, they did compete with the Company. The Company wished to show that the Council had so unfairly used their existing powers that they had done the Company an injury, and that therefore they ought not to be granted further parliamentary powers unless they were fair to the Company.

The CHAIRMAN: Someone must get powers with regard to these streets first. Has it not occurred to you that, if they obtained powers in this way, it would give you a good case to come and ask for similar powers on the ground of competition?

Sir R. LITTLER: Yes; but look at the expense.

The CHAIRMAN: But why oppose anyone getting what you admit is a necessary power?

Sir R. LITTLER: If one grocer has a right to go down a street and deliver tea and coffee and another has not, obviously the one who has the power will go and the other will not. Continuing, Counsel said there seemed to be a question as to the degree of the competition. Let them observe, however, how this might be applied. The Council would get a little this year, a little next; and in this way, little by little, they would get over the whole of the Company's area. This was the first time the Council were seeking to go outside their own district. The Company alleged that the Council had competed with them in the past in a manner that was unfair and unjust to them, and that an extension of this method of competition to the new district would extend the injustice. The Company asserted that the Council, where they were the local authority for public lighting—in regard to which they were in direct competition with the Company—had invoiced electrical energy at a high price, for the express purpose of trying to show profit on the electric lighting undertaking. In order to injure the Company, the Council were supplying at a loss in the whole district; and this loss fell with severity on the Company. While deprived of the opportunity of supplying gas for public lighting, the Company, as ratepayers, had to contribute towards the loss. The Company would probably be content with the application of the Northumberland Clause, the effect of which would be to secure that the Council should not supply at a loss in either the old or the proposed new area.

Mr. VESEY KNOX remarked that the Company who had power to supply in the Colney Hatch district were authorized to lay pipes in streets not dedicated to the public use.

Sir R. LITTLER went on to point out that the Council sought power to increase their present loss by providing that, if consumers paid within any time the Council liked to fix, they would allow them a discount. The Company wished for further parliamentary provision to ensure that no further burden should be thrown on the rates.

Mr. R. S. CLEASE claimed that the North Middlesex Gas Company had *locus*—both as ratepayers and on the ground of new competition. Clause 4 provided for the extension of the area, and although the Council did not propose to extend into the area of his clients, they were entitled to be heard, because, as ratepayers, if the extension resulted in further loss, they would have to bear a proportion of it. The proposed allowance of discounts was a new form of competition. By clause 11, the Council would get statutory power to go into non-dedicated streets. At present the North Middlesex Company could, by agreement, go into these streets, on the application of even one owner. By obtaining an application from one owner, the Council would be able to keep him out of such a street, although by going there the Council would make a loss. Surely as ratepayers the Company were entitled to be heard to prevent the waste of public money, a portion of which they would have to find.

Mr. MOON: Have you mains and pipes in some of these streets?

Mr. CLEASE: We have.

Mr. MOON: Will it not be necessary to move the pipes?

Mr. CLEASE: I was coming to the point of their interfering with our pipes and mains.

Mr. BEALE: Your objections come to this: You object to their having certain financial powers because you fear they may use them injudiciously.

Mr. CLEASE: Yes.

Mr. BEALE: Has a ratepayer ever been allowed to come on that ground?

Mr. CLEASE: I think a gas company have.

The CHAIRMAN: Your contention would carry you to this, that on the mere allegation that a ratepayer might be affected by any Bill he would have *locus*.

Mr. CLEASE: It is not quite the same thing. A company cannot attend the local meetings under the Borough Funds Act and make a case there. Continuing, Counsel argued that the power to give discounts would be used by the Council to the detriment of his clients.

Mr. MOON: If they are entitled to give discounts to large consumers, you would say, I suppose, that they could compete more effectively then than now, because they cannot reduce the price to large consumers without reducing it all round?

Mr. CLEASE said that was so. He claimed *locus* on the ground of competition in private streets. At present his clients could, by agreement, lay mains in private streets. If the Council had the power, at the request of an individual or individuals, to go into private streets, his clients would never be able to enter those streets by agreement, not even when they became public streets.

The CHAIRMAN said they would like Counsel for the promoters to reply on the claims of the Barnet and Southgate Companies.

Mr. VESEY KNOX, K.C., on behalf of the Finchley Urban District Council, said, with regard to going outside their area, the whole question was whether the degree of competition was such that, in accordance with their practice, and in their discretion, the Court would think fit to grant *locus*.

Sir D. BRYNMOR JONES: Is there not a question of principle? It is obvious that the competition is very trivial at present; but it is urged that it may become serious.

Mr. VESEY KNOX said the preamble of the Bill would effectually prevent the present case being used as a precedent for any large extension. The competition, being in itself trivial, the only question was whether such a principle was raised that, having regard to the danger of future applications for extensions, the petitioners were entitled to be heard to assert that principle rather than protect themselves. They might be so entitled but for the special circumstances of the present extension. He did not know of any case in which *locus standi* had been allowed on the ground of principle where the competition itself was trivial. The preamble of the Bill in the present case defined the principle—namely, that where there was a main down the middle of a road, it was convenient that persons not only on one side of the road in the district of the Council, but those on the other side of the road which was not in the district of any authorized supplier, should be able to get access to it for purposes of supply. This limited the principle; and in the nature of the case there could not be many such. This was really not so much a case of extension of area as of rectification of boundaries as a matter of convenience. Where an extension was trivial in itself, and where the principle was so carefully guarded that it could not be made a ground for defending a further extension, there could be no ground for the suggestion of the Gas Companies. It was clear from the map that the extension proposed could do the petitioners but little harm; and whenever any proposal for a further extension was made, the Companies concerned would have full opportunity of being heard. It was not at all likely that any local authority would seek, bit by bit, to enter another area. Such action would be very expensive, and was not worth considering. The real object of the petitioners was not merely to oppose the present extension, but to raise all sorts of matters relating to the working of the undertaking which Parliament had already authorized in competition with them.

The CHAIRMAN: Suppose they were limited to Part II. of the Bill?

Mr. VESEY KNOX said that would let them in on everything. The object apparently was, under cover of this alleged trifling new competition, to get in in order to put the promoters of the Bill to the proof as to the prices they charged for public and private lighting, and to raise all sorts of allegations which had been inserted in the petitions, most of which happened to be untrue, but which, whether true or false, were irrelevant.

Mr. MOON: Will you not be able to tell the Committee they are all irrelevant?

Mr. VESEY KNOX: In effect you cannot limit them.

Sir D. BRYNMOR JONES: How would you suggest that the *locus* should be limited, assuming we think there ought to be *locus* to some extent?

Mr. VESEY KNOX said he could only suggest a limitation to clause 4. A limitation was, however, of very little use in one sense, because a petition was so drawn as to bring in all sorts of facts as to the Council's undertaking. All that was in the petitions was as relevant to clause 4 as to the whole of Part II. This was why, if the Court allowed *locus*, even against clause 4, they would put the Council to the proof, with expert evidence and at enormous expense, as to all their undertaking. Having regard to the great expense which might be involved, the Committee should not allow the *locus* at all. Once petitioners were let in on the ground of competition, there was no way of effectually preventing them going into everything.

After further discussion, the Court allowed *locus* against clause 4, relating to the extension of the area of supply of electricity, to the Barnet and Southgate Companies, and against clause 85 (power to open valves in case of fire) to the Barnet Company. But no *locus* was allowed to the North Middlesex Company.

GOSPORT GAS BILL.

House of Commons Committee.—Thursday, March 5.

(*Before Mr.* WHITBREAD, *Chairman, Major* RATCLIFF, *and Mr.* PEARSON.)

This is a Bill promoted by the Gosport Gas and Coke Company, for the purpose, among other things, of defining the limits of their operations, and for power to construct and maintain works on land which they already hold, and charge differential rates in outlying parts of their district.

Mr. HONORATUS LLOYD, K.C., and Mr. DILL appeared for the promoters; the petitioners (the Gosport and Alverstoke Urban District Council) being represented by the Hon. J. D. FITZGERALD, K.C., and Mr. CLEASE.

Mr. HONORATUS LLOYD, in opening the case on behalf of the promoters, said the first object was to define the limits of the Company's operations, on which no point arose. The Company further sought to obtain power to construct and maintain gas-works on land which they already had, and to charge differential rates in outlying parts of their district. They were at present supplying gas within the urban district. It was not unusual, under the circumstances of the Company, for Parliament to grant a differential rate so as to enable a gas company, in supplying the less populous districts, to make a slightly higher charge in respect of gas. The people in the outlying districts did not object to a higher charge. With regard to the provision for the consolidation and conversion of the ordinary capital, it had become a common practice to have one class of stock bearing a uniform dividend; but it was always better to have the capital as nearly as possible at its nominal value, because people were much more apt to invest at prices near the nominal value than to give considerable premiums. In most gas cases in recent years consolidation of the shares into stock had taken place. There was no inconvenience or hardship, because it did not

alter the amount to be divided as dividend. In the present case it was proposed to convert the 10 per cent. stock into a higher nominal value and make it 6 per cent. stock. By the Act of 1865, the capital was limited to £50,000, of which £21,375 was defined as original capital, and the balance of £28,625 as additional capital. The prescribed maximum price for gas was 4s. 6d. per 1000 cubic feet. There was a subsequent Act, in 1873; but during the time between these Acts the Company's career had not been a very prosperous one, and the net income had been very much reduced. The maximum price for gas was then altered to 5s. 6d., and later it again dropped to 4s. 6d. The Company had raised and spent the whole of their authorized capital, and had overdrawn on the bank. By the present Bill, the Company were authorized to raise additional capital of £48,000 at a rate of dividend of 6 per cent., which would be the same as the prescribed dividend if they were allowed to consolidate. By clause 27, they were enabled, out of the revenue of the Company, to set up a renewal fund. It was proposed also to alter the testing burner. Dealing with the petitions, Counsel said the petitioners drew attention to the fact that at Portsea Island the charge for gas was 2s. 4d. per 1000 cubic feet, as against 3s. 6d. charged by the Gosport Company. But the Portsea Island Company had 200 consumers per mile of main; and the output was more than twelve times that of the Gosport Company. The petitioners had also inserted a purchase clause; but the matter had never been before the ratepayers or discussed by the Council.

Mr. *Corbet Woodall* then gave evidence. He said that by the Act of 1865 the capital of the Company was fixed at £50,000 in shares, with £12,000 borrowing powers. He was of opinion that the proposed higher price in the outlying districts was a reasonable one. A supply of gas by small independent undertakings in the outlying villages would, of course, be the only alternative; and such undertakings could not sell at anything approaching the very moderate price asked for by the Company. The gas sold for the year ended Dec. 31, 1907, was 95½ million cubic feet. The further development of the prepayment system of supply, for which there was still much scope in the district, would necessitate a larger capital outlay per unit than hitherto; and he had taken £750 per million as the sum needed for new business. Parliament usually granted gas companies sufficient capital to meet their requirements for about fourteen years. The present Bill asked for an additional £72,333, which would enable the Company to go on for rather less than that number of years. The time had come when the Company were in want of further capital; the whole of their capital having been called up and the loan capital issued to the full amount authorized. At the end of 1907, the Company had overspent £4900. Another object of the Bill was to manufacture gas on land already in their possession. There was a large area outside the boundaries of Gosport and Alverstoke where it would be much to the advantage of the public if the Company were able to supply gas; and nobody raised any objection to this or to the differential rate.

Mr. FITZGERALD said he did not object at all to the conversion of capital if it was necessary, provided an increased charge was not made upon the consumer. The question was whether the Company were right in their contention that the Act of 1873 altered the 7 per cent. stock and made it 10 per cent.

Witness (continuing his evidence) said there was a tendency to increase the size, and consequently the cost, of gas plant and apparatus. It would not be fair that the low rate charged for heating and power purposes should apply to the local authority for lighting purposes. He was in favour of a standard rate of 3s. 6d. with a sliding-scale. The renewal fund, for which provision was made in the Bill, had in recent years very frequently been permitted by Parliament. His view was that it was much better to make provision in advance, so as to be able to deal with renewals when they needed to be undertaken, rather than spend the money and then have, through a series of years, to recover the money that had been spent in a lump sum.

Mr. FITZGERALD said that slightly different questions arose as to the renewal fund when they were dealing with a maximum-price company and with a sliding-scale company. He gathered that his friend agreed that he would meet them on the point of the sliding-scale; and he understood the Lord Chairman had taken the question of the renewal fund into his consideration this session, and was going to give some decisions upon it. Under the circumstances, and more especially as he would ask the Committee to take the Bill as a Sliding-Scale Bill, he did not think it necessary to discuss the renewal fund at all.

Witness: Does that mean that the renewal fund will be approved?

Mr. FITZGERALD: I am informed the whole question of the renewal fund is before the authorities of the two Houses; and the Lord Chairman's Counsel has stated that the Lord Chairman would give a decision on the question. That being so, it seems unnecessary to discuss it here. When the Lord Chairman of the other House gives a decision on a technical question of this kind, the parties must abide by it.

Mr. HONORATUS LLOYD: I have not the least objection to that.

Witness went on to say that the opponents, in their petition, complained that the maximum price of gas was unreasonable; but they were now charging 3s. 6d. per 1000 cubic feet, whereas in recent years they had charged 4s. 3d. With regard to the purchase clause in the petition, there was no ground whatever for compulsorily depriving the Company of their property. The charge for public lighting was 2s. 8d. per 1000 cubic feet. During the next ten years they were almost certain to double their output of gas. The works were being enlarged at a more rapid rate than ever before, and more money was being spent upon them. He did not agree that the increase in the Company's business in recent years had been only slight. He admitted that, with the price of coal falling and with the adoption of the new burner, it would be possible to produce a cheaper gas than at present. This would affect the standard rate. The percentage of unaccounted-for gas was high, and could be reduced.

Mr. *Alfred Loach*, the Secretary of the Company, then gave evidence.

Friday, March 6.

On the resumption of the proceedings this morning, evidence was called in support of the Urban District Council's petition.

Mr. *William Cash* said he had examined the books of the Company, and notwithstanding the provisions of the Act of 1873, they had for a great number of years paid the same dividend on the 7 per cent. capital as on the 10 per cent. On the 7 per cent. capital, they had paid for 25 years, 1 per cent. more than they should have done. The proposed conversion of the shares was contrary to the usual practice. The large increase that was taking place in the consumption of gas was attributable to the use of the slot system. In his view, where there was no renewal account, the practice, rightly or wrongly, was to charge the heavy expense over a period of years to suspense account. It was better for the consumers that money should be raised by loan capital than by share capital, provided too much was not raised in this way.

Mr. *E. H. Stevenson* then gave evidence. He said the district about Gosport was chiefly composed of dockyard artisans; and any extension of the supply of gas would be in those houses where at present there was no supply. There had been an increase during the past ten years of just under 3 per cent., and in the past five years of just under 4 per cent. He had taken as his basis 4 per cent. as a fair rate of compound interest. In the future, the increased consumption at the end of twelve years would be 60 million feet. It would be necessary to pull down one of the benches of retorts and re-construct it. When re-constructed on a modern basis, the retorts would be sufficient for the quantity of gas required. The expense of carrying out this improvement would be about £3000, of which £1680 ought to come out of revenue. There were other improvements necessary. The gasholders were very much below the proper capacity. A holder should be erected at once. A make of a million cubic feet of gas per day was as much as they would supply within twelve years. The total expenditure would be £38,000, instead of the £72,300 asked for in the Bill. The Company should have authority to borrow in respect of their existing capital a further sum of £4166, and they should have power to raise by new share capital £26,000, and by borrowing £8666—giving a total of about £39,000. The sliding-scale had been found in practice to work very beneficially for both parties. It was an inducement to great economy in the working of a Company; and the price was considerably lower than in the case of maximum price companies. In this case, the Company had been paying 8 per cent. on the whole of their ordinary stock for the past 25 years. As to the fair standard rate of dividend for the Company, his opinion was that they were not entitled to pay more than 10 per cent. on the original capital and 7 per cent. on the additional capital. The standard rate of dividend was 8¾ per cent. at the outside; and at 3s. per 1000 cubic feet, the Company could pay a standard rate of dividend.

Mr. FITZGERALD: So that if you take the standard price of 3s. 6d., the effect would be that they could increase the existing dividend without reducing their price?

Witness: They will pay 10 per cent. and 7 per cent. without increasing the price at all from 3s. 6d. Continuing, he said the Company might raise their existing price, and still keep the dividend at 8 per cent. It was often the practice to give a company at least the price that they were actually charging; but in the present case, with a price of 3s., the Company would be able to pay a standard dividend of 8¾ per cent.

This completed the evidence on behalf of the petitioners.

Mr. FITZGERALD, in addressing the Committee, pointed out that on the previous day he had referred to the renewal clause being under the consideration of the Lord Chairman and his Counsel; and he afterwards used the expression, "the authorities of the two Houses." He was then under the impression that the matter was also being considered by the Chairman of Ways and Means; but he was now informed that he went beyond what he ought to have said. It was being considered by the Lord Chairman in the other House and his Counsel only. He would be prepared to say that the renewal fund question might remain in the Bill in this House; and ultimately, when the decision of the Lord Chairman was given, if he came to the conclusion that the clause should go out, then the promoters would have to strike it out, and if he thought it ought to remain in the Bill, it would be useless for the petitioners to contest the matter in the other House.

The CHAIRMAN: You will offer no opposition to the question, and it will remain in the Bill and meet its fate elsewhere?

Mr. FITZGERALD said that was how the matter stood. Continuing, Counsel asked the Committee to allow the purchase clause, and to strike out sub-section 2 of clause 38, with reference to the alteration of the bargain with regard to lighting, &c., in the Act of 1865. As to the additional capital, £63,500 had been sufficient for 73 years; and now they wanted £72,300 for the next 14 years. He went on to ask that a sliding-scale should be adopted. A fair rate of dividend would be 8 per cent.

Mr. DILL replied for the promoters, and submitted that this was not a case in which a purchase clause should be inserted in the Bill. They had no objection to the sliding-scale and the standard price so long as the latter was fixed fairly for both parties. They would be satisfied if the dividend were fixed at 9 per cent. With regard to the standard price, it ought to be 3s. 6d. As an alternative, he suggested a neutral zone; the charges being 3s. 4d. and 3s. 8d.

The CHAIRMAN: In the event of a sliding-scale, have you anything to say as to the suggestion of a neutral zone?

Mr. FITZGERALD remarked that he had no objection to the neutral zone; but he objected to the prices quoted by Mr. Dill. He would suggest 3s. and 3s. 6d.

After a short deliberation in private,

The CHAIRMAN delivered the decision of the Committee. They passed the preamble. The purchase clause suggested by the petitioners they did not propose to insert. The question of the price to the Local Authority they did not propose to alter from what it was at present according to law. With regard to the extended lands, the Company should have the use of them as proposed in the Bill. The capital would be cut down from £72,000 to £50,000. As to the standard dividend and price, they fixed 8½ per cent. as the standard dividend, and 3s. 6d. as the standard price, without the neutral zone.

Monday, March 9.

When the Select Committee resumed its sittings, some discussion took place with reference to the amount which the Company should be allowed to carry forward from year to year, after having paid their dividend and having provided for the reserve and insurance funds.

The Committee limited the carry-forward to the amount of one year's dividend.

LEGAL INTELLIGENCE.

WATER COMPANY'S RIGHT TO SINK WELLS.

In the Chancery Division of the High Court of Justice, on Feb. 28, Mr. Justice SWINFEN EADY had before him the case of *Attorney-General v. Frimley and Farnborough District Water Company*, which raised a question of considerable importance to water companies. It was brought at the relation of the Baroness Dorchester, Baron Basing, Sir Henry Mildmay, Mr. Horace Walpole, and several other landowners in the neighbourhood of Odiham and Winchfield, Hants, to obtain a declaration that the defendants were not entitled to sink wells and erect a pumping-station on certain lands they had purchased by agreement in the parish of Odiham, and an injunction to restrain their proceeding with such works, on the ground that they were not authorized by their Act, and were *ultra vires*.

Mr. CRIPPS, K.C., and Mr. WHINNEY (instructed by Messrs. Radcliffe, Cator, and Hood) appeared for the relators; Mr. MACNAGHTEN, K.C., and Mr. COZENS HARDY (instructed by Messrs. Johnson, Weatherall, and Sturt, agents for Messrs. Potter and Crundwell, of Farnham) represented the Company.

Mr. CRIPPS, in opening the case, said the Company was incorporated in 1893, by an Act of that year which incorporated the Water-Works Clauses Acts, 1847 and 1863. As usual, there were deposited plans and books of reference showing where the works were to be constructed, and there was power to take other lands, not exceeding 5 acres, within the limits of supply (which included Farnborough, Crondall, and Blackwater), by agreement. In 1898, another Act was passed, entitled the Wey Valley, Frimley, and Farnham Water Act, by which the limits were extended to Odiham, Sandhurst, Crowthorne, and so much of the parishes of Yately, Frimley, and Ash as were not already included. It was also provided that the consent of the Rural District Council of Hartley Wintney should be required before any powers were exercised within the parish of Odiham. There was also authority for the Company and six other specified Companies named, or any two or more of them, to enter into agreements for supplying one another with water in bulk. In 1901, a Provisional Order was granted, under which the limit of lands to be taken by agreement was extended from 5 to 10 acres; and by another Order obtained in 1904 the limits of supply were enlarged to include Winchfield. The Company had recently acquired by agreement three pieces of land in the parish of Odiham, bordering on the River Whitewater, and near the road leading from Odiham to Greywell, and were claiming the right to sink wells and erect a pumping-station thereon, for the purpose of supplying water within their own limits, and also of selling it, if desired, to other companies. These lands were not shown on the deposited plans referred to in the Act of 1893; and the plaintiffs' contention was that the defendants had no power to construct the proposed works, which were therefore *ultra vires*. In the statement of claim there were allegations that the effect of the proposed works would be to withdraw water from the Whitewater, which flowed into the Loddon and thence into the Thames, and to diminish or destroy the wells and streams in the neighbourhood, and so injure the property of the relators. He, however, did not propose to call evidence about this, as it seemed to him to be purely a question of construction. Counsel proceeded to read the various sections, and submitted that the Company had no power to construct any other works than those specifically authorized. Section 30 gave them power to purchase other lands by agreement for the general purposes of their undertaking; but, in his view, this only meant the subsidiary purposes, such as storing pipes, building offices or workmen's dwellings, and so forth, and could not be held to include sinking wells and erecting pumping machinery. The object of the deposited plans was to give notice to all persons who might be affected of what was intended to be done, so that they could attend before the Parliamentary Committee, and get clauses inserted for their protection, if necessary. But no one had any notice of these proposed works. He did not know of any decided cases exactly in point; but in *Simpson v. South Staffordshire Water-Works Company* it was held that a water company were not entitled to use a certain field for any other purpose than that shown on the deposited plans; and in *Heron v. Rathmines Improvement Commissioners* it was also held that where certain definite works were authorized to be carried out at a specified place, one could not give the go-bye to these powers, and construct other works in a different locality.

Mr. WHINNEY, in continuation of his leader's argument, cited cases to show that the question whether or not certain things were *ultra vires* depended upon whether they were incidental to, or consequential upon, the main purpose of the company. In the present case, it could not be contended that the new works were specifically authorized by the Act, or that they were legitimate additions or extensions thereof. It was really the establishment of a new water supply, without any authority, and ought to be restrained.

Mr. MACNAGHTEN said he was prepared with evidence, if necessary, to show that no harm would be done to any of the relators. But the question had been confined to one of construction, and as such he would deal with it. The point was whether what the defendants were doing was or was not within their powers; if it was, there was no doubt they were justified in doing it, because they really wanted the water to supply their district. He submitted that, having properly acquired this land by agreement, they were entitled to use it in any way they saw fit for the purposes of the Company. There was no express limitation of their power in the section. The specific works mentioned and authorized in section 23 were to be carried out on the lands compulsorily taken; and this was the point in the cases cited. Powers with regard to certain defined lands had been departed from; but this had no application to lands taken by agreement, which might be used for the general purposes of the Company. The object of the Act, as recited in it, was to provide for an adequate supply of water in the district. Section 6 said: "The Company shall be established for the purpose of making and maintaining the water-works and for supplying water within the limits of this Act, and for carrying on the business usually carried on by water companies and generally for carrying the powers of this Act into execution." There were three things included there—to make and maintain the water-works, to supply water, and to carry on the business of a water company; and he submitted that the sinking of wells and the putting up of pumping machinery came clearly within the second and third. Section 30 gave power to acquire land by agreement for the purposes of the undertaking; and when it was required, section 6 applied, and it might be used for any of the purposes of the undertaking, including the sinking of wells. It might also be regarded as an extension of the existing works, as the water, when raised, was to be pumped through a short piece of new main, and then through the present mains to the reservoir near Crundell, which was the highest point in the district, and served the whole of it by gravitation.

Mr. COZENS HARDY followed. He dwelt upon the obligation the Company were under to supply water to the district, and submitted that their powers were intended to be correlative with their duties.

Mr. CRIPPS, in reply, said the argument on the other side came to this—that if the Company had not a sufficient supply of water under their statutory powers, they could go and poach anywhere; and he pointed out that the Company had authority to procure a supply in bulk from other companies if necessary.

Justice SWINFEN EADY, in giving judgment, said the object of the action was to obtain a declaration that the defendants were not authorized, under their statutory powers, to construct certain additional works upon three pieces of land which they had acquired for tapping a new water supply and pumping water into an existing reservoir, for the purpose of supplying their district. The case of the relators was that the land in question, bordering on the River Whitewater, though within the limits of supply, was not a source from which the defendants were entitled to take water, and that they had no statutory power to sink wells or construct other works at the place—that, in fact, defendants were establishing at the spot new water-works; their powers being, it was said, limited to those vested in them by their Special Acts and their Provisional Orders. The Company's Act of 1893 provided that plans and sections showing the situation and levels of the works authorized, &c., should be deposited. By section 3, the expression "water-works" was defined to mean the water-works and the works connected therewith authorized by the Act. Having read section 6, his Lordship referred to section 23, under which power was given to the Company to make certain water-works. It was a limited power—power to make and maintain in the situations and according to the levels shown on the deposited plans and sections; and the section contained a detailed description of the works authorized. Then followed power to the Company to take water, and a definition of the water they might take. By section 28, five years was the limit for the completion of the works; but it was said that "nothing in this section shall restrict the Company from extending their works, mains, &c., from time to time, whenever it shall be necessary for the purpose of increasing or distributing the supply of water within their existing limits of supply." Then section 30 enabled them to purchase additional land to the extent of 5 acres, by agreement, "for the purposes of the Act and for the general purposes of their undertaking, or any easement, not being an easement of water, in, over, or under such lands." But no buildings were to be erected on them, except such as were required for the purpose of the water-works. Section 51 gave the Company power to enter into agreements with two other companies for the purchase of water in bulk for the purposes of the Act. The Company, therefore, were authorized to construct defined works and to obtain a supply of water by means of these works, or from the two companies specified. By a subsequent Act, they were entitled to purchase land up to 10 acres, the limits of supply were enlarged, and power was given to make agreements with several other Companies; but there was nothing in the subsequent Act or Orders which affected the principle which had to be decided. The Company had within their extended area acquired certain land, almost on the western boundary of their limits; and they claimed the right—and he understood they had, in fact, commenced the works—to sink one or more wells on this land. It was an entirely new source of supply, some miles from the works specifically mentioned in the Statute. Their object was to obtain an additional and independent water supply, to put up pumps, lay a new rising main leading from the new pumping-house a certain distance to connect with an existing main, and then convey the water into a reservoir some three or four miles away. The allegation was that in doing this the Company were exceeding their powers, and that they had no right to erect the new water-works. There was nothing within the four corners of the Act empowering the Company to proceed with the new works except the provisions to which he had called attention. In his opinion, the provision as to acquiring additional land by agreement enabled the Company to purchase land for purposes ancillary to their statutory undertaking—for the purpose either of making subsidiary works or to enable them to carry on more beneficially their statutory undertaking, and did not extend to permitting them to acquire land for the purpose of carrying on upon it what was in substance a new undertaking. The proposed work did not come within section 28. It was not an extension of the works, mains, and pipes; it was not an extension of their own works. It was a new source of supply—new works not contemplated by the Act. It was said that the Company were only carrying on the business which section 6 provided they should be enabled to carry on. But, in his view, the true construction of this section was that the Company were established for the purpose of making and maintaining the water-works limited and defined by the Special Act, and that their powers to supply water and to carry on their business must have reference to those works. This construction was assisted by the language of section 30, which gave them power to purchase an easement, but prohibited their acquiring an easement of water in, over, or under the lands purchased by agreement; the view being that their sources of supply were only those contained in the Act. In his opinion, the Attorney-General had made out a claim for an injunction to restrain the defendants from constructing upon the land in question a pumping-station, wells, or other subsidiary works for the purpose of raising, collecting, or storing water, or for carrying the same away for the purpose of their general undertaking. The costs would follow the event.

Mr. MACNAGHTEN said the statement of claim raised an issue which

had not been gone into—viz., that the defendants' works would diminish or destroy the streams and wells in the vicinity, and do all sorts of damage to fishing and other rights. The defendants had come prepared with expert evidence to meet this issue; and he asked that they should have the costs thus incurred.

After some discussion,

His LORDSHIP directed that the plaintiffs should pay the defendants' costs so far as they were increased by this issue, with a set-off.

It was further agreed, after a short discussion, that the operation of the injunction should be suspended if notice of appeal was given within a week and prosecuted without delay.

Mr. MACNAGHTEN said he would apply to advance it.

RIGHT TO SUPPORT FOR A RESERVOIR.

As briefly recorded in the "JOURNAL" last week, the House of Lords (the Lord Chancellor, Lord Macnaghten, Lord James of Hereford, Lord Robertson, Lord Atkinson, and Lord Collins) have dismissed the appeal of the New Moss Colliery Company, Limited, from an order of the Court of Appeal (Lord Justices Vaughan Williams, Romer, and Cozens-Hardy), dated Dec. 11, 1906, which reversed a decision of Mr. Justice Farwell, dated Dec. 12, 1905. [See "JOURNAL," Vol. XCII., pp. 692, 838.] The action was brought by the Manchester Corporation, as the owners of certain lands in Lancashire, for an injunction to restrain the defendants (the appellants) from so mining as to let down, and thereby injure, the lands and reservoirs of the respondents, for whom judgment was entered in the Court of Appeal. The arguments were heard at the end of January, and judgment was given on the 28th ult.

Mr. Cripps, K.C., Mr. Upjohn, K.C., and Mr. M'Swinney appeared for the appellants; Sir Robert Finlay, K.C., Mr. Jenkins, K.C., and Mr. Moulton for the respondents.

The Lord Chancellor, in a written judgment, said the Corporation of Manchester purchased two plots of land under their Special Act, which gave them power to acquire land by agreement, but not compulsorily, for the construction of water-works. One piece of land was purchased from Lord Stamford, who reserved the right to work minerals without paying compensation; the other, from Mr. Taylor, and included both the surface and mineral rights. Water-works were in course of time constructed on the latter piece of land; and now the owners of the minerals under the other piece had worked them in such a way as to cause subsidence of the land purchased from Mr. Taylor. The excavations which did the damage were partly within and partly beyond a belt 40 yards in width round the works of the Corporation. Before work was begun in the 40-yard belt, notice was given to the Corporation; but no counter-notice was served. In these circumstances, the question to be decided by the House was whether the mine owners ought to be restrained from mining so as to damage the land bought from Mr. Taylor by working either the mines under the 40-yard belt or those outside it. He agreed that the Court of Appeal was right on both points. The purchase of the land by the Corporation was voluntary, having no power to purchase compulsorily; and in buying the land from Mr. Taylor they were entitled to the same rights as he had to lateral support. Section 22 of the Water-Works Clauses Act, 1847, required the owner of any mines or minerals beneath or within a prescribed distance, and if no distance was prescribed then within 40 yards, to give notice to the undertakers before he worked them. If the undertakers did not desire to have the minerals worked, they might secure the necessary support on payment of suitable compensation. The present appellants no doubt gave the notice required by the Act; and no counter-notice having been received, section 23 provided that the mine owner was authorized to work into the belt as if the Act of 1847 and the Special Act had not been passed. That was to say, if he had, apart from the Acts, a right to do so, he might work the minerals; but if he had no such right, then the Act did not enable him to work them. If the Acts had not been passed, the owner of the land sold by Mr. Taylor would have had indisputably a right to lateral support of his surface in its natural state against the owner of minerals beneath the land adjacent; and he (the Lord Chancellor) did not see how in this case the right had been destroyed. Mr. Cripps had argued that the effect of the Act of 1847 was to obliterate all pre-existing rights to support for the surface from the minerals either subjacent or adjacent to the works in respect of whatever lands were purchased under the Act. His Lordship did not see any ground for this contention. It would involve a free gift of a most valuable right to a neighbouring owner of minerals, and a ruinous withdrawal from the undertakers of rights most essential to the safe maintenance of the water-works, without compensation, and, so far as he could see, without reason. He agreed that the Legislature might do such a thing; but he found nothing in the Act which said they had done so, even indirectly. Neither did he find any judicial authority for it antecedent to the decision of Mr. Justice Farwell. The argument of Mr. Cripps really amounted to this—that because a conveyance, under the Act, of surface, leaving minerals in the hands of the vendor, did not confer upon the surface a right to support, therefore whenever any land was bought by undertakers by virtue of the Act, every easement for support hitherto attaching to it, whether vertical or lateral, was destroyed. He should not so hold unless directed by some Act or authority which he was compelled to follow. Consequently, he was of opinion that the land purchased from Mr. Taylor was entitled to support from the adjacent land, which it had always possessed; and the decision of the Court of Appeal was right.

A written judgment was also delivered by Lord Atkinson, who said he concurred generally with the Lord Chancellor. He thought that there was no implied protection for the land purchased from the Earl of Stamford, and that the owner of the minerals had the right to work them under the land without let or hindrance. When he came to Taylor's land, however, none of this reasoning applied. There the Corporation had the right to lateral support, vested in them by the purchase from Taylor; and as the words of the Water-Works Clauses Act, "as if this Act and the Special Act had not been passed," could not operate to vest in the plaintiffs a right in reference to the former land which they never had, so neither could it operate to deprive them of the right they had acquired, and would, if the parties were remitted to their original positions, have been entitled to enjoy and enforce. He concurred with Lord Justice Cozens-Hardy in thinking that the result as to Taylor's land would be the same whether the workings which caused the subsidence were within or beyond the 40-yard limit; and he approved of the results at which he had arrived, and of the reasoning by which he arrived at them.

The other noble and learned Lords concurred; and the appeal was dismissed, with costs.

ALLEGED INSUFFICIENT SUPPLY OF WATER.

The case of *Simpson v. South Oxfordshire Water and Gas Company*, which recently came before a Divisional Court, consisting of the Lord Chief Justice and Justices A. T. Lawrence and Sutton, raised the question whether a Company which had supplied some water, but an insufficient quantity, for domestic purposes to a particular house were liable to a penalty under section 43 of the Water-Works Clauses Act, 1847. It appeared that the plaintiff, Mr. A. Talford Simpson, had for eleven years been supplied with water through a 1-inch pipe—this being perfectly sufficient; but in April last defendants removed it, and substituted one ½-inch in diameter. As the supply then became insufficient, a summons was taken out, which, on coming before the Magistrates at the Caversham Sessions, was dismissed, on the ground that, as some water came through the ½-inch pipe, a penalty could not be imposed. The Magistrates found as a fact that at certain times in the morning the supply of water was inadequate for the baths. On behalf of the Company, it was argued that they could only be convicted if they neglected to supply any water at all to the premises; that if they furnished some water, but neglected to give sufficient, the remedy was by *mandamus*, injunction, or damages.

Mr. Acland, K.C., and Mr. Spokes appeared for the plaintiff; Mr. Macmorran, K.C., and Mr. Walsh represented the defendants.

At the close of the hearing, their Lordships said they would take time to consider their judgment; and this was delivered on Monday last week by the Lord Chief Justice. He said the defendants were summoned, under section 43 of the Water-Works Clauses Act, 1847, for neglecting or refusing to furnish the plaintiff with a supply of water. The Justices found as a fact that the defendants did neglect to furnish the plaintiff with a sufficient or reasonable supply of water for his domestic purposes. This finding made it unnecessary for the Court to consider the circumstances under which the defendants substituted a ½-inch pipe for one of larger diameter, which substitution led to the shortness of supply. The only point they had to determine was whether the neglect to give a sufficient supply of pure water was an offence under the section cited. It was contended on behalf of the defendants that the only offence in respect of which a water company was liable to a penalty under that section was if there had been complete interruption of the supply for some part of the time for which the rate had been paid or tendered; and that, inasmuch as they did supply water at the rate of 3 gallons a minute during the whole time, the offence contemplated by the section had not been committed, and that the plaintiffs must pursue some other remedy. Having indicated the scope of the sections bearing upon the question, his Lordship said section 43 apparently contemplated four offences: (1) The neglect to fix, maintain, and repair fire-plugs; (2) neglect to furnish to the Town Commissioners a sufficient supply of water for public purposes; (3) neglect to keep the pipes charged under the pressure specified in section 35; and (4) neglect or refusal to furnish a supply of water to a person entitled to receive it. Mr. Acland contended that the supply of water contemplated by the section was the sufficient supply (section 53) of pure and wholesome water (section 35); and that any neglect of the Company to give such supply constituted an offence under this part of section 43. His Lordship said the question was by no means free from difficulty; but, on the whole, the Court were of opinion that the argument of the defendants was correct. This penal section must be construed strictly. In their judgment the offence contemplated was the complete interruption of the supply, with the daily penalty; and that the words "want of supply" at the end of the section did not mean want of sufficient supply. They thought this view was supported by the absence of the word "sufficient," which occurred in the earlier part of the section with reference to the supply to the Town Commissioners; and had it been intended to deal with the case of deficiency in quantity or impurity, the language would have been different. Mr. Walsh, for the defendants, relied upon certain expressions in *Jackson v. Farnham Water Company*, *Sheffield Water Company v. Wilkinson*, and *Sheffield Water Company v. Carter*. In the opinion of the Court, however, these cases did not give them much assistance, as the Judges were clearly not considering the point to be decided in the present case. Mr. Acland, on the other hand, relied upon the Judgment of Lord Cairns in *Atkinson v. Newcastle Water-Works Company*, in which case, dealing with the four classes of neglect, Lord Cairns spoke of the fourth as the neglect to furnish any owner or occupier with a supply of water to which he was entitled, and as the owners or occupiers asking for, and not getting, their proper supply. These judgments were delivered in the Court of Appeal, and were, of course, binding upon the Divisional Court, as well as being judgments of very high authority. But the question they had to consider was neither raised nor argued in this case; and it seemed to them that Lord Cairns was not putting any construction upon, or considering the exact nature of, that which he described as the fourth class of neglect. In their opinion, the fourth offence in respect of which a penalty was inflicted under section 43 of the Act of 1847 was the interruption of the supply, and not the neglect to supply a sufficient quantity, of water. In the opinion of the Court, therefore, the action must be dismissed with costs.

Mr. Acland asked leave to appeal; but their Lordships thought they could not grant it.

The gross profit of the Pontefract Corporation Gas Department for the past six months was £2341, and the net profit £854, against, it is stated, £581 earned in the corresponding half of 1906, when the undertaking was in the hands of a Company.

MISCELLANEOUS NEWS.

THE MINES (EIGHT HOURS) BILL.

Deputation to the Home Secretary.

A Deputation, representing the Institution of Gas Engineers, the Gas Companies' Protection Association, and the British Iron Trades Association, waited upon the Home Secretary (Mr. Herbert Gladstone) at the Home Office, Whitehall, last Thursday, to express their views with regard to the Coal Mines (Eight Hours) Bill, which has been introduced by the Government.

The Institution of Gas Engineers were represented by Mr. W. Doig Gibb (Newcastle-on-Tyne), President, Messrs. Thos. Glover (Norwich) and James W. Helps (Croydon), Vice-Presidents, Mr. S. Y. Shoubridge (Lower Sydenham), Hon. Secretary, Messrs. Edward Allen (Liverpool), R. Bruce Anderson (Westminster), Thomas Berridge (Leamington), John Bond (Southport), J. H. Brearley (Longwood), Charles Carpenter (South Metropolitan Gas Company), T. H. Duxbury (South Shields), W. Prince (Stoke-upon-Trent), John Young (Hull), and Mr. Walter T. Dunn, Secretary.

The Gas Companies' Protection Association were represented by Sir George Livesey, Vice-President, Sir J. T. Firbank (Newport, Mon.), and Messrs. H. E. Jones (Chairman), A. Allan (Scarborough), E. Allen (Liverpool), W. Belton (Shrewsbury), T. Berridge (Leamington), C. E. Botley (Hastings), W. G. Bradshaw (Commercial Gas Company), A. E. Broadberry (Tottenham), Frank Bush (South Metropolitan Gas Company), G. Clarry (Cardiff), W. F. Cotton (Dublin), E. W. H. Eady (Southampton), R. W. Edwards (Aldershot), C. Stafford Ellery (Bath), W. M. Fawcett (Cambridge), B. R. Green (Mitcham and Wimbledon), Douglas H. Helps (Reading), Joseph Hawksley (Lowestoft), Hanbury Thomas (Sheffield), E. L. Burton (Brighton), R. O. Paterson (Cheltenham), A. E. Phillips (Barnet), W. R. Phillips (Hitchin), Stanley C. Sherrard (Kingston-upon-Thames), A. G. Snelgrove (West Ham), D. Milne Watson (Gaslight and Coke Company), P. G. Winstanley (Wolverhampton), T. Wolferstan (Plymouth), and Fred. E. Cooper, Secretary. The Swansea Gas Company were represented by Messrs. R. W. Cooper and Sons.

The subject was introduced by

Mr. F. J. Cay (South Staffordshire), who stated the views of the British Iron Trades Association; contending that the increased price of coal would considerably add to the cost of producing iron and steel. He said that it was generally agreed by the coal owners that the cost of coal would be increased by about 1s. 6d. per ton; and this would mean an increase in the cost of the manufacture of steel and iron of 6s. a ton.

Mr. W. Doig Gibb, on behalf of the Institution of Gas Engineers, thanked Mr. Gladstone for his courtesy in consenting to receive a deputation. He said the Institution was composed of members practically representing every gas undertaking in Great Britain and Ireland; and the subject, of course, was a very important one for them. They were apprehensive that the effect of the passing of the Bill would be very detrimental indeed to their industry. He appreciated that the Home Secretary's time was valuable; and therefore he would merely call upon Sir George Livesey.

Sir George Livesey said that he was there as representing the Institution of Gas Engineers; but those present, numbering considerably more than forty, were connected with two Associations dealing with gas matters. There was the Institution of Gas Engineers, which consisted entirely of officials and engineers; and there was also the Gas Companies' Protection Association, which represented the companies. The Gas Companies' Protection Association had had to communicate with all the gas companies throughout the kingdom, which took time; and they had not yet received all the replies. From the answers which had come to hand, it appeared that companies in all parts of the kingdom had consented to support this movement excepting one; and that was a case of a gas company of which the Chairman was a Member of Parliament. They had applied to corporations; but they were not present, because the answer was that it was a political matter, and they would have to divide about it. The first question was, What was the object of the Bill? He thought the great body of consumers of coal had some ground of complaint against the promoters of the Bill, for they had never declared their object.

The Home Secretary: By the "promoters," do you mean the Government?

Sir George Livesey: No, I do not mean the Government. Proceeding, he said the Miners' Federation officials were the promoters. Those people would not appear before the Departmental Committee which the Government appointed. He was informed only a fortnight ago by a very influential member of that Committee that unfortunately they would not appear, and therefore the Committee were unable to ascertain the reasons why they promoted the Bill. That gentleman said the Committee might have found their action was based on some false economic theory, or something of that sort. He (Sir George Livesey) thought he could speak for all his friends when he said it was rather hard on the great bulk of the people of this country that a small section should promote a Bill without giving their reasons for so doing. It always seemed to him that if they had good reasons for it, they would be only too anxious to put them forward. A suggestion had been made as to whether, after the second reading, the Bill could be referred to a Committee, so that witnesses should be called who would be compelled to attend and declare their object.

The Home Secretary said the matter had only just emerged from the Departmental Committee.

Sir George Livesey: Yes; but they would not attend, and would not give their reasons.

The Home Secretary: At any rate, you have got all the reasons against it.

Sir George Livesey: But I want the reasons in its favour. He went on to say that he was on the Labour Commission, where they had witnesses on the eight-hour question—the Socialist witnesses. He asked them time after time: "Why do you want an Eight-Hour Bill?" The answer was: "To absorb the unemployed." Then he said: "Suppose you got an Eight-Hour Bill, and there were still unemployed, what would you do?" The reply was that they would reduce the day to six hours; and Mr. Ben Tillett said: "I would go to four hours." He could not help thinking that it was part of the Socialist plan for getting an eight-hour day by Act of Parliament; and the objection he made to that was one of principle—that it was wrong to interfere with adult labour well able to take care of itself. The Committee stated that the health and conditions of coal miners at the present time compared favourably with that of any other class of workpeople. Therefore they were not helpless, unprotected people; and there was no necessity whatever why they should have this Bill passed in their favour. He believed it would be the beginning of the eight-hour movement. There were four or five Bills in Parliament at the present moment for an eight-hour day. He would now proceed to the effect of the Bill on the gas industry. The effect of the Bill would, they believed, be to increase the cost of coal; and it would increase it in this way. He did not suppose that it would cause a permanent shortage of coal; he believed that the supply would be soon brought up to equal the demand. But coal was a very peculiar thing; and if there were only a fear of a shortage, the price immediately went up. He was old enough to remember all the coal panics or famines—he called them panics—of 1872, 1892, 1900, and this recent one. There had never been a shortage of coal; but there had been fear of a shortage, and users of coal had bought large quantities in order to protect themselves against possible difficulties. At any rate, the result had been a large increase in prices; and they felt that if the Bill passed there would be either a shortage of coal for a time or fear of a shortage, which would tend to put up the price, as it always had done. All the testimony seemed to show that there would be an increased cost of getting coal. Mr. Cay put the price at 1s. 6d. a ton. He (Sir George) held in his hand a form of contract sent to the Gas Department of a Corporation in the Manchester district. They applied for tenders for coal; and in every tender received there was this clause: "That the prices under this contract shall continue until such time as the Act limiting the period of underground labour in mines comes into operation, after which the prices under this contract shall be increased 1s. 6d. a ton."

The Home Secretary asked if anybody had accepted that contract.

Sir George Livesey said they had not accepted yet, and he hoped they would not. Of course, he would admit at once that if a colliery owner put such a clause as that into a contract, he should refuse to accept it, and then there would be a contest between them. The colliery owner might force him to accept it, or it might be the other way about.

The Home Secretary: Let us suppose this Bill passes into law, and assume, for the sake of argument, that there would be a considerable decrease. Still, a man who takes that contract would have to pay 1s. 6d. a ton more.

Sir George Livesey: Yes; and I hope none of my friends will accept such a contract. Proceeding, he said it still pointed to this—that the cost of getting coal must be increased by the Bill; he did not know how it could be avoided. The hours of getting coal would be reduced, and there was every reason to believe that it would materially increase the cost of coal. Supposing it did cause an increase, what would the gas people do? They would be able to transfer the cost, at any rate as far as five-sixths of it was concerned, to the consumers. These were the people who were most to be considered—the consumers of coal and of gas. If the extra cost of coal was 1s. 6d. a ton, it would mean 2d. per 1000 cubic feet added to the price of gas, which would come to about £1,500,000 a year; and the consumers of gas were in number about equal to the householders. In London and in its immediate suburbs there were 1¼ million consumers, and in the country about 6 millions. They used 15 million tons of coal a year in the gas industry; and one great object of those who were engaged in it had been to sell gas as cheap as possible. It was to their own interest to do so, as most of them were under a sliding-scale. They got a small increase of dividend for every reduction of price, and therefore the interests of consumers and suppliers were identical. Then they had to face strong competition with rival lights; consequently a low price was a necessity for them. Moreover, it was a great advantage to the public. If they could only sell gas at a sufficiently low price, the smoke problem would soon be solved. Their ambition was to sell it at such a figure that it might be used commonly as fuel. They had been struggling long to attain this object—for the last sixteen or seventeen years; and now the price of gas in London was about the same as it was in 1890. To permanently increase the cost of coal would permanently increase the price of gas, and therefore put a burden on the consumers. The greater part of these—more than half, and approaching two-thirds—consisted of the working classes, who obtained gas by the penny-in-the-slot meter; and he submitted that it was a matter for consideration for the welfare of the general public as against a small section of them. There was one other reason why he thought the passing of the Bill would be a great mistake. What was wanted in this country was some unity—some identity of interests—between employers and employed, and also, so far as possible, an inducement for them to work for the benefit of their consumers. So far as gas companies were concerned, there was an inducement. They received a small increased dividend for reducing the price of gas. If they could induce the coal owners and miners to work together by some method or system by which the various interests might be identified, a great advantage would result to the nation, and the terrible disputes and strikes which occurred would be put an end to. As it was, they were in a most unsatisfactory position; and he was afraid that the passing of the Bill would stereotype and intensify the spirit of antagonism which already existed. He thought he might put it on public grounds that it would be a mistake to pass the Bill. He was satisfied that the object of the miners was to increase the cost of coal; that was no secret. One of his friends—Mr. Corbet Woodall, the Governor of the Gas-light and Coke Company, who was unfortunately not able to be present—had informed him on the previous day that Mr. Enoch Edwards told him that he had tried to persuade the coal owners in the Midlands to combine in order to increase the price of coal to the gas companies.

He said they ought to pay more, and could well do so. There was an idea that gas companies were paying very large dividends, which was not the fact. Since the auction clauses were introduced in 1876, the dividend was only about 4½ per cent. The feeling among the miners was, he believed, to get a reduction of hours with the same or increased pay. Was that to be done to the disadvantage of all the rest of the country? He was sorry to have to put this to the Home Secretary; but he could assure him that the feeling was very strong. The gas people were unanimous; and he thought that it would be a great disadvantage to everybody in the country to make this important innovation by passing an Eight Hours Bill.

Mr. H. E. JONES said the Gas Companies' Protection Association consisted of all the leading gas undertakings in the kingdom, and there were in the room representatives not only of the great London Companies and the suburban ones, but also the Chairman of the Dublin Gas Company, and representatives from Sheffield, Liverpool, Hastings, and many other places of importance. Sir George Livesey rightly told the Home Secretary that some 15 million tons of coal were used in making gas. There was a capital of £124,000,000 in the hands of companies and corporations carrying out the duty of converting solid coal into fluid coal. In the opinion of most of the 28 gas companies with which he was personally connected, the consumers numbered three-fourths of the labouring classes to one-fourth of the other classes; and most of these classes used gas for fuel. It was a convenient and cheap way of getting their coal delivered to them. The Company with which he had been connected for forty years in the East of London had in their district an enormous number of small traders—tailors, hatters, tinmen, and others—who used gas for industrial purposes; and besides this, there were 1000 gas-engines in the district. To all of these an increase of 1s. 6d. a ton on coal would be something alarming. It would mean 2d. per 1000 cubic feet on the cost of gas which these poor industrial people in the East-end of London would have to bear. On the point of whether there would be an increase of cost, he might say what was the effect of the introduction of the eight-hour movement into the gas world. They worked for 24 hours; but it was decided to divide the work into three shifts of eight hours each. It was thought that this would make no difference to the cost of gas; but the effect was to increase it by 33 per cent. They contended that the Unions were strong enough to bring about the eight hours themselves, if they really wished, without interference by Parliament at all.

The HOME SECRETARY: Might I ask whether the increased cost was due to some diminution in the efficiency of the labour or some increase of the wages?

Mr. JONES replied that the men got the same wages, or a very small increase with certain privileges of overtime; but what he had said represented the outcome of it. The Union was strong enough to urge the men that they need not work as they did before; and the increased number of men produced no more gas. Now, what had been the further result of all this? Since the eight-hour day was introduced, machinery had been brought into the movement to such an extent that he did not think there were three men now employed where there were twelve employed before. He asked the Home Secretary to be careful how he imposed on all the industrial systems extra cost for an article which was becoming absolutely a necessary of life, and urged that he should not assist in putting on what they regarded as a restriction of the output, as it must result in an increase of the cost, which would affect not only the gas industry but everyone in the kingdom dependent upon a supply of cheap fuel.

Mr. HANBURY THOMAS (of the Sheffield United Gaslight Company) remarked that Sir George Livesey had stated that the miners had never given any reason why the Bill should be passed. He happened to be at a meeting on Monday evening, and a representative of the miners was there; and the question was put to him as to why the Bill should be passed. He said: "Because they had been asking for it for twenty years." Mr. Gladstone was a free trader; but it seemed to him (Mr. Thomas) that this was protection. They were protecting one class of labour against other classes of labour. If they protected these men by an Act of Parliament, the effect would be to put up the price of coal. If they put up the price of coal in a large manufacturing town like Sheffield, it must increase the cost of the gas which they manufactured there. Sheffield sent goods all over the world, and had to meet very serious competition from foreigners; and if they made the cost of manufacturing dear, it must render competition with foreign countries more difficult. The result would be a larger number of unemployed than at the present time. When this state of unemployment was brought about, of course, it would be put down to every reason but the right one. They would want the State to support them. But when they had passed this Act, it would be a very difficult matter to get it repealed. Now, if it was left to the miners to agree with the colliery owners, and it was found not to succeed, it could be altered; but they knew what an Act of Parliament was, and how very difficult it was to get anything of the kind altered. He should say the miners were one of the strongest body of men in the whole kingdom. They had their Unions; and they had large sums of money. They earned good wages; and they were not working excessive hours. He could not see why they should be singled out for any special care on the part of Parliament. He hoped that the matter would be very seriously considered before the Bill was allowed to pass into law. In Sheffield, they supplied 10 per cent. of their gas for gas-engines; and gas was also used very largely for various manufacturing purposes. They had managed to get it down to a low price; but if the cost of coal went up, the price of gas would certainly rise also. It would not affect the shareholders; but it would affect the consumers, and the very poorest of the people. Out of their total of 90,000 meters, 69,962 were for two and three lights, which meant that the labouring classes were largely dependent upon gas for lighting, warming, and cooking their food. He thought they might as well put a duty on food at once as increase the cost of coal. It came into every house in the kingdom. The Home Secretary might say that the consumers had not made any protest; but it was a very difficult thing indeed for the consumers to do so, as they had no organization. He thought that the gas companies might now be given credit for not only representing the shareholders, but for having studied the consumers to a great extent; and this was a case where they might put in a word for consumers.

Mr. W. H. BUTLIN (the President of the Iron Trades Association) then addressed the Home Secretary on behalf of that body.

The HOME SECRETARY, in reply, said that, so far from complaining of their coming there to see him, he welcomed the deputation; and if he had any complaint at all, it was perhaps because they had not come sooner. As a matter of fact, the whole brunt in Parliament of pointing out obvious risks attending legislation such as that which was under consideration, had fallen upon himself—to such an extent, indeed, that nearly two years ago, in the course of a debate on the Bill which had been introduced by the miners' representatives to establish a bank-to-bank eight-hour day, he was charged by one of his political friends with having made the strongest speech against an eight-hour day for miners that had been heard in the House of Commons. It was only last January that he received a very powerful and thoroughly representative deputation of coalowners from all parts of the country. He then again drew attention to the singular fact that the users and consumers of coal did not seem to be alive to what must be admitted to be at any rate the possible risks of a Bill which proposed to enact a distinct limitation of the hours worked by miners below ground. Therefore he welcomed the presence of the deputation, and thanked them for their speeches, because he thought they would tend to bring home, not only to the country but to Parliament, that a measure for which he and his colleagues were directly responsible required most careful and close consideration. There were many interesting points on which he should like to speak if time permitted. Sir George Livesey had raised the question of why the Bill was introduced—why its real promoters did not give evidence in support of it before the Committee. He also asked whether this was not part of a Socialist movement to lead to diminution in hours in the coal and other trades; and he challenged practically the principle of the Bill. They would not expect him to go into the whole subject now; but he wished to say this with regard to the principle—that it was a fact that for more than twenty years an Eight Hours Bill had been before the Houses of Parliament; and in recent years the movement of opinion in the House of Commons, for what it was worth, had shown itself more and more decisively in favour of such a Bill. They might criticize anything they pleased on the part of members of the House of Commons. But they had to recognize a certain force, a certain movement of public opinion; and when this public opinion, as represented in Parliament, reached a certain point, it was impossible to withstand it. It was also necessary to point out that England was not the only country where this movement was evident. France was ahead of us in this respect, and had already in operation an Act which limited the hours underground, and which was designed to be an Eight Hours Act. They had all kinds of limitations; and it was too soon at present for any safe deductions to be made from the working of the Act. But, at any rate, there was one in operation; and what had happened in France and in England would no doubt take place before long in Germany, —possibly even in Belgium—and it was likely to take place in Canada and the United States. However, there it was; and they had to face the fact that there was already a movement in favour of shorter hours, and that perhaps, so far as the miners were concerned, we had arrived at a more definite point than had been reached in any other direction. He had had practical acquaintance with mines all his life, and knew as much as most amateurs. He did say there was a difference between working underground and working overground; and this was the main justification for dealing with the question. He admitted that, so far as health was concerned, in a properly organized colliery the health of the men did not suffer. Of course, it must always be remembered that the men were subject to appalling catastrophes. He had just heard, unfortunately, with regard to the men imprisoned by the fire in a mine in the Birmingham district, that they were apparently beyond any possibility of rescue. Well, they were subject to these appalling catastrophes; and he further said that, so far as they could do so safely, having regard to the prosperity of the industries of the country, they ought to secure the most reasonable hours for the men who had to work underground—to work, after all, in an unnatural condition, in darkness, and away from the light of the sun. So much on the general question. The real practical point appeared to him to be this: Would this Bill, in its present or in any other form, in fact curtail production, and cause a permanent increase in the price of coal to the users and the consumers generally? That was the point they had to consider. If it was true that the Bill would raise the price of coal by 1s. 6d. per ton, of course it must be admitted at once that this would be a most serious matter for the industries of the country. He did not think that Mr. Cay or Sir George Livesey, or any other speaker, had in the least degree underrated the seriousness of such an increase. This question had most seriously occupied his mind, and would continue to do so. The Committee who had dealt with the question had gone into details with the utmost thoroughness, and had presented a most valuable report—a considered report—which regarded the question with absolute impartiality, noticing certain risks and certain dangers, and, on the other side, showing where, under the present arrangements of working, there was what they might call a margin on which they could draw in the event of a limitation being proposed. He must remind the deputation that, after the most careful investigation, the Committee found that the average number of hours worked per man per day through the year was now 7¾. This, of course, had regard to voluntary absenteeism, stoppage of mines, and so forth. He would also remind them that in the face of the Bill passing there were other margins beside those involved in the stoppages of pits for one purpose or another and from voluntary absenteeism. One of the arguments against the Bill was that its becoming an Act would mean a diminution of employment at the bank. Many colliery owners argued against it because they might have to inaugurate double shifts, and this would mean more men. This argument was also used in the Durham and Northumberland districts. But there was this most remarkable fact which he wished to bring to their attention. If he remembered aright, the increase in the number of men working in and about pits in the year 1906 as compared with 1905 was 18,000. The increased number last year compared with the preceding year was no less than 58,000. This, to his mind, was a conclusive answer to the suggestion that a limitation to eight hours or thereabouts would create the necessity for working double shifts, which would be rendered

impossible by a shortage of men. He thought they had now seen, by the experience of the last two years, that there was an expansiveness in the supply of men for the collieries which practically settled this particular difficulty. Besides the possibility of the adoption of double shifts, there was also undoubtedly a certainty that mechanical coal-cutters would come much more generally into operation throughout the country. He was perfectly well aware that the 10-yard seam was a very difficult one to work; and it had to be worked, and even then with difficulty, by hand. He was also aware that the coal-cutter could be employed only where the seams lay favourably for its working. At the same time, they were very much behind in this country. He thought the number of coal-cutters at work now was less than 1000, whereas in America they were far ahead of us in this respect. He thought that there was a certain margin to which they could look. Then there was the question of shorter hours for hewers; and, after all, it was the output by them which really governed the situation. Shorter work by hewers would mean, to some extent, proportionate increase of production. The Committee had found, by careful examination, that where the hours of the hewers were shorter, the product was slightly higher in proportion. Certainly shorter hours of hewers and shortened hours in mines, where they were working on an eight-hour basis now, had not led to an increase. He agreed that if, under any Act, there was such pressure that there was a dangerous speeding-up of winding up and down, or hurrying of various processes which were necessary for safety down below ground, it would be a most serious matter, and would have to be dealt with accordingly. He had really said what he wished to say at the present moment, because, after all, this matter would have to be decided by the House of Commons. He had already expressed his view to the mine owners that the differences on this question between them and the men were practically so small that they ought to be amicably settled; and he looked upon the Bill as likely to afford a fair basis for settlement. He could only assure the deputation that his colleagues and he were fully aware of the great national importance of the subject. They were quite aware of the grave mischief which would be caused if, in fact, the limitation of hours did produce great curtailment of production, and consequent material increase in price. They were conscious of these matters, and they would give them their most careful consideration. The presence of the representatives at that deputation would help in turning the opinion of Parliament to a side of the question which had, perhaps, been too much neglected in the House of Commons for consumers, and which he honestly thought it was essential should be considered in the interests both of the small and of the large consumers in the country.

Sir GEORGE LIVESEY thanked the Home Secretary for receiving the deputation and for the assurances he had given. They were glad to hear that the Government were fully aware of all the difficulties connected with the subject; and if the result was to bring the masters and men together, it would be the best thing that could have happened. But they ought to come together without being forced to do so by Act of Parliament.

The deputation then withdrew.

QUALITY OF THE GAS IN DUBLIN.

At the Monthly Meeting of the Dublin City Council, on Monday of last week, some discussion took place as to the quality of the gas.

Alderman Farrell, in moving the adoption of a report of the Lighting Committee having reference to proceedings against the Gas Company, remarked that the Committee had made order after order instructing the Law Agent's Department to prosecute the Company; and their instructions had not been carried out. If the Corporation wanted to know why this was so, they would have to apply to the Law Agent's Department. The Committee did everything they could to bring about a prosecution. They put on a minute months ago ordering an appeal from a decision of the Magistrates; but to this day the appeal had not been brought. He was privately informed, now that he was out of the chair, that no appeal was going to be brought; but he was still on the Committee, and he was determined to see whether or not they could get the full 16-candle power which they were paying for. There was a difference of opinion between the Company and the Corporation; and it was quite possible both parties might be perfectly honest in the matter. The Company had their photometer for testing the gas. The Committee had apparatus which was up-to-date and approved by the Board of Trade; but the Company had declined to recognize what it registered as the quality of the gas. It was reported to the Committee that the Company were giving them sulphuretted hydrogen in the gas; but it was also said to them that where the tests showed that there was a large amount of dangerous matter in the gas, these tests were not carried out in the station that was named in the Act of Parliament for the purpose, and therefore no matter what candle power the Company were giving, the Committee could not proceed, because they would be outside the Act. But there were many tests made in their station by their officer, who was supposed to be an independent person, owing no allegiance to the Gas Company or to the Corporation—merely an umpire or assessor between the two parties; and nearly all his reports showed that the Company were not giving them the minimum 16-candle power. The Board of Trade Inspector made tests, now and then, when the fit took him; and sometimes he sent them the results of the tests, and sometimes he did not. He tested the gas once in three months; and his figures did not always agree with those of the Committee's officer. The Law Agent would ask for explanations from the Company of an allegation that on certain days the gas was below the standard quality; and the courteous reply was that the Committee were altogether wrong, and that the Company were able to say that on that certain night the gas was over the candle power. The Committee put their officers into Court to prove it was not up to 16 candles according to their apparatus; and the Gas Company put up their inspector to prove that they gave 17, 18, or 19 candle gas by their photometer. The Inspector of the Committee had acted straightforwardly towards the Corporation; he had cast aside the ties of kinship, and had reported that the Gas Company were not doing the right thing. During his (Alderman Farrell's) year of office, which had now expired, the Law Agent's Department did not do what was fair by the Lighting Committee, and gave them practically no assistance. They would never get good gas until they took the Law Agent's Department in hand.

The Law Agent (Mr. Rice) having been sent for, and had explained to him what Alderman Farrell had said, remarked that it appeared to him to be a very general statement; and he might answer it in general terms by saying it was inaccurate. But it was due to the Council that he should give a particular denial to the statement. Prosecutions were taken against the Gas Company for several months. He personally advised the Corporation to go on with these prosecutions. Perhaps it might embarrass the Corporation in future proceedings if he said what his own view was; but he advised the Corporation to go on, though he was not very enthusiastic in advising it. Three summonses were heard. One of these the Corporation won simply because the Company admitted that on that particular occasion the gas was not up to the standard, and said it was owing to an accident. In the other two cases, the Magistrate decided against the Corporation, on the ground that he was not satisfied that the certificate of Mr. Cotton, their Gas Examiner, was sufficient to induce him to convict on what was a criminal charge. On this, the Corporation applied for a case to be stated on several points of law. The Magistrate consented, the case was prepared by Counsel and by himself (the Law Agent), and forwarded in the usual way to the Counsel and Solicitor representing the Gas Company. Counsel on both sides kept the papers a long while. Part of the time was the Long Vacation, when most Counsel were out of town. After pressing the Solicitors to the Gas Company to return the case, it was returned, accompanied by a letter saying that their Counsel were unable to approve of the Corporation case or to amend it; and they submitted a case of their own. This case, he (the Law Agent) returned to them; and he sent the Corporation case on to the Magistrate as originally drafted. The Magistrate, having received both cases, adopted the Gas Company's draft. He (the Law Agent) submitted the question of going to trial on that, as suggested by the Magistrate, to his Counsel; and prolonged correspondence followed between them and the Magistrate (Mr. Swift). Eventually their position was that they would accept the statement of facts, but not the statement of the point of law. After further correspondence and consultation with Counsel, Counsel directed him (the Law Agent) to say that they would not go to trial on the case, as the Magistrate had finally settled it; and he (the Law Agent) wrote a letter to the Committee and to the Company informing them of the decision of Counsel. So far as he was concerned, he said emphatically that there was no unavoidable delay on his part. While the question was going on about the case stated, several reports were sent in by the Inspector of Public Lighting, to the effect that the gas was below the proper illuminating power. The Committee asked his (the Law Agent's) advice, and acted on it. He suggested they should do nothing until the matter was settled one way or the other.

Alderman Reigh said that their reports for 27 days showed that on 16 occasions the gas was below the standard. If they were not to act on these reports, they had better shut up the testing-station and let the Company give what they liked, and charge what they liked.

Alderman Farrell, on rising to speak again, was received with some signs of dissent; but he said this was a small question of £30,000 or £50,000 to the city. He thought the Law Agent should show them a way out of the difficulty. During the strike the complaint was that the Company were not purifying the gas, and therefore it contained sulphuretted hydrogen.

Alderman Cotton said they would not deny that there was a proportion of sulphuretted hydrogen in the gas; but, having regard to the amount of it, it could not do a human being any harm at all.

The report was then agreed to.

EDINBURGH AND LEITH GAS COMMISSIONERS.

Annual Dinner.

The Annual Dinner of the Edinburgh and Leith Gas Commissioners was held at the Royal British Hotel, Edinburgh, last Tuesday evening. The company numbered about 100; there being present, by invitation, many representative citizens. Among the guests were also Mr. Alex. Wilson, Gas Engineer to the Corporation of Glasgow, and Bailie M. W. Montgomery, the Convener of the Gas Committee of the Corporation of Glasgow. Provost MACKIE, of Leith, presided, in the absence, through indisposition, of Lord Provost Gibson.

Mr. J. DUNCAN MILLAR, Advocate, in proposing "The Corporations of Edinburgh and Leith," referred to the heavy task which lay upon those who entered municipal life, on account of the magnitude of municipal enterprises.

Bailie MAXTON acknowledged the toast. He said there was no doubt that the municipalities of the present day had to face a great many demands which were not faced by their predecessors. The Town Councils of Edinburgh and Leith were very much interested in the Gas Commission. From the Edinburgh Town Council they sent fifteen representatives charged with the duty of looking after the gas supply. But the Council were not content to give them full powers in this respect. They had, in the Corporation, some who were gas experts—who considered they could teach their representatives on the Gas Commission something they did not already know about gas. They wanted to instruct them how they were to vote on the Commission; they wanted to tell them what their duties were; and they wanted to criticize—sometimes with a considerable amount of ignorance—their actions in the Commission. They wanted to dictate to them; but they were not delegates from the Town Council, to go there, as was said to him a day or two before, as a sort of gramaphone, to turn out opinions which had been put into their heads. They were there to exercise their own abilities, and to do the best they could for the gas interest; and he, for one, would not receive instructions from anyone as to what his actions on the Gas Commission were to be. Many of these criticisms were born in ignorance and brought forth in

mischief. What was the history of the Gas Commission? When the Commission came into existence, there were three sources of gas supply—the Edinburgh Gas Company, the Edinburgh and Leith Gas Company, and the Portobello Gas Company—all of which they had taken over. They had erected new gas-works at Granton without the loss of a single hour of the supply of gas to the consumers; they had reduced the price of gas and done away with meter-rents; and in many ways they had improved the condition of the employees, and also improved the manufacture of gas. Altogether, he could see no reason why the gas industry, as conducted by the Commission, should not be regarded as one of the enterprises carried on by the Corporation which were a credit to them and a profit to the citizens.

Bailie HALL responded for the Corporation of Leith.

Bailie MONTGOMERY, of Glasgow, proposed the toast of "The Gas Commissioners." He took it that the Gas Commission were engaged in much the same sort of work that the Glasgow Gas Committee were engaged in. They were both trying to please the public; and they were all aware that it was oftentimes a very thankless task to do so. It was very difficult to please people with the quality of the gas. Sometimes in Glasgow they were told that the quality of the gas was so poor that it could scarcely find its way through the pipes; while, in Edinburgh, he had heard it whispered it was so rich that it could scarcely find its way out. He was glad, however, to know that in one particular they were not beyond taking an example from Glasgow, because he understood that they were about to apply for powers to reduce the standard illuminating power of their gas. He thought that, for all practical purposes, in these days of the extensive use of gas for commercial and other purposes, a standard of a medium quality was about the best they could work by. There was, however, one feature in connection with the Gas Commission in which they were rather different from Glasgow. He learned that they were not free from criticism; but he understood that they were altogether a free and independent body. The Glasgow Gas Committee were not so favourably situated. They required to report to Cæsar. They required to pass their minutes; and, he assured them, it was sometimes a very difficult task to get them passed unchallenged. He congratulated the Commissioners upon the splendid works they had at Granton. He had visited them on more than one occasion; and he must say that he was extremely delighted with them, both in their architectural features and in their working arrangements. It seemed to him that everyone must feel that the works redounded very much to the credit of their Engineer, Mr. Herring. They might rest assured that, in the matter of gas supply, they in Edinburgh and Leith were perfectly safe in the hands of Mr. Herring.

Bailie BRYSON, of Leith, the Convener of the Works Committee, in response, said he could assure them that the inhabitants of Edinburgh and Leith were proud of their gas-works. The Gas Engineer to the Glasgow Corporation had been doing a great work in the magnificent plant they had erected at Provan. He had adopted a system of heating the retorts which had cheapened the production of gas; and he congratulated their friends from the West upon the success of the system. In Edinburgh, notwithstanding the adverse influence of the high price of coal, necessitating an increase in the price of gas, the consumption had gone up very materially in the past year.

Judge MALLINSON, the Convener of the Finance and Law Committee, also responded. He said the Commission were one of the best criticized of the public bodies in the city; and he took this to mean that it was the best managed of the public bodies. The Commission began, nineteen years ago, with the great handicap of 10 per cent. perpetual annuities to the shareholders of the old Gas Company of Edinburgh; but they had reduced the price of gas, and abolished meter-rents—to the amount of £10,000 a year. He believed, now that they had got to the end of their tether in the matter of capital expenditure, they would be able to point to the Gas Commission as an example of how a public body should do their work.

Judge GRIEVE, of Edinburgh, proposed "Our Officials," to which Mr. W. R. HERRING, the Engineer, briefly responded.

The proceedings were brought to a close by the singing of "Auld Lang Syne."

Sales of Stocks and Shares.

At the Mart, Tokenhouse Yard, E.C., last Tuesday, Mr. Alfred Richards sold various parcels of stocks and shares in gas and water companies, including a new issue by order of Directors. This consisted of 1000 new ordinary £10 shares in the Southend Water Company, entitled to a maximum dividend of 5 per cent. An interim dividend at the rate of 4 per cent. per annum in respect of the half year ending the 30th of June last has been paid on existing similar shares; and at the forthcoming annual meeting of the Company the Directors will recommend a final distribution at the rate of 5 per cent. per annum—making 4½ per cent. for the year. All the new issue was sold at par. The other lots belonged to the estate of a deceased lady. They included £182 of consolidated ordinary stock of the Enfield Gas Company, carrying 5½ per cent. dividend from the 1st of January last, which was sold at £113 per £100; 60 fully-paid £5 original 10 per cent. shares in the Romford Gas Company, which fetched £12 each, *cum div.* at the rate of 12 per cent.; some consolidated "B" and "C" 7 per cent. stock of the Croydon Gas Company (last dividend 11½ per cent.), which realized from £232 to £236 per £100; a small parcel of ordinary 5 per cent. stock of the South Suburban Gas Company, which was sold at £119 per £100, and some 5 per cent. perpetual debenture stock of the same Company at £118 per £100; consolidated ordinary 5 per cent. stock of the Gravesend and Milton Gas Company, at £103 to £104 per £100; and ten fully-paid £10 original shares in the West Kent Gas Company, carrying 10 per cent. dividend, at £21 10s. each. On Thursday, Messrs. Maxey and Son conducted a second sale of new ordinary £10 shares in the Wisbech Water Company. Out of 600 shares offered, 532 were sold, at an average of £15 5s. each—a slight increase on the price realized for similar shares last October.

For the past year, the Directors of Wilsons and Mathiesons, Limited, in their report, recommend a dividend of 6 per cent., carrying forward £3916.

METROPOLITAN GAS COMPANY OF MELBOURNE.

The Sixtieth Ordinary General Meeting of this Company was held at the Offices, Flinders Street, Melbourne, on the 28th of January—Mr. JOHN GRICE in the chair.

The report and accounts for the six months ending Dec. 31 having been presented,

The CHAIRMAN, in moving their adoption, said he would compare them with the working of the year 1906, and in some cases with earlier years, in order to show the progress of the Company. The balance-sheets showed that the total amount received for gas last year was £349,745, against £319,341 in 1906—an increase of £30,404. The quantity of gas sold was 1470 million cubic feet, compared with 1342½ millions; being an increase of 9½ per cent., and the greatest improvement known in any year since 1881. After the crisis in 1893, the minimum sales were in 1898, when the gas sold was 984 millions. It was very gratifying to record that every year since then had shown an advance, culminating in 1907, when the sales were approximately 50 per cent. over those of 1898. On Dec. 31 in that year, they had 54,318 meters fixed; and on that day in 1907, they had 76,743—an increase of 41 per cent. This was almost as satisfactory as the augmentation in the quantity of gas sold, as it proved that the business was each year being placed on broader, and therefore more solid, foundations. The number of slot meters, which were included in the 76,743, had increased in the year from 4727 to 8184. The receipts through this channel in 1907 were £15,219. The shareholders would probably agree with the Directors in thinking that there was every good reason for forecasting continuous improvement, especially when they were informed of the business done through the stove department, which during the past year, under Mr. Scotland's management, had been full of activity and had been what they were justified in calling a "record" year. The number of stoves on hire on Dec. 31 last was 10,429—an increase of 1486 over the previous year; and during the twelve months the department sold, on hire-purchase and outright, 2151 stoves. The Directors knew, therefore, that there was an approximate increase of stoves in use to the extent of 3637 during the year. As 1906 showed an increase of 1694, the two years had added no less than 5331 stoves to those in use. It was therefore justifiable to hope that Melbourne people had at last awakened to what had been for years recognized in England—viz., the necessity of having and using gas-stoves. The Directors expected that the great demand experienced would continue, especially as the heat of the seasons rendered them more a necessity than in colder climates. The number of incandescent burners sold was 13,303; and of mantles 122,823. In another small item—gas-irons—great progress had been made. Of these, 189 were sold in 1905, 539 in 1906, and 1450 in 1907. All other appliances, such as boiling-rings, gas-fires, &c., showed an increase in sales in a smaller degree. The returns from residuals in the two last years were: From coke, £49,568 in 1907 and £40,397 in 1906; from tar, £21,411 and £19,358; and from sulphate of ammonia, £12,652 and £10,768. The small stocks at present on hand of all these products showed how keen had been the demand for them. Since the previous half-yearly meeting, the Privy Council had given their decision in the matter of the appeal by the Company against the judgment of the High Court of Australia, which upheld the claim of the City Council of Melbourne to charge different prices for the supply of electricity. The decision was against the Company. There were two features in the balance-sheet the Directors desired to have improved. The unaccounted-for gas was proportionately larger than for the year 1906. It was difficult to account satisfactorily for all of this; but they had no doubt that their Engineer (Mr. Philip C. Holmes Hunt) would make a thorough investigation, and endeavour, as far as possible, to do away with the leakage. The other unsatisfactory feature was the fact that their cash balance did not increase, and was, he feared, not likely to do so for the present. The only item on the debit side of the balance-sheet calling for special comment was that of "Repairs and maintenance at works, £21,103." This heavy increase would not come as a surprise to any shareholder, because the reasons for the expenditure had been fully explained on several occasions. At the preceding half-yearly meeting, the large amount of reconstruction then in progress at the Company's two largest stations—West and South Melbourne—was referred to. The Directors were now able to inform the proprietors that the reconstruction of the No. 2 retort-house at West Melbourne was completed during the half year. The work had entailed the rebuilding of the whole of the retort-settings, with their accessories and stage floors, on new foundations, which the unstable nature of the ground necessitated. This house had also been equipped with the latest type of electrically-driven stoking machinery. At the South Melbourne works, where they had a much larger scheme of reconstruction on hand, the work had been well advanced during the half year. It was their intention to reconstruct the retort-house in two portions. The northern half—with which portion they were now proceeding—would contain 20 new beds of retorts, heated by regenerative furnaces. The scheme involved not only the erection of a new retort-bench, but also the enlargement of the coal-store; it being desirable to provide more accommodation for the storage of coal in view of what almost promised to be ever-recurring troubles in the coalfields. The new retort-benches would be equipped with the latest type of machinery similar to that installed at West Melbourne. This portion of the reconstruction which the Directors hoped to have completed some time during the winter, entailed an expenditure of £38,000. As, however, the output of gas was increasing rapidly, and in no district more than in the southern suburbs, the reconstruction of that half of the retort-house would have to be commenced immediately on the conclusion of the present work, so as to bring up the full strength of the plant to modern standards, and provide for the increasing demand for gas. In order to carry out this portion of the programme of reconstruction and other necessary improvements on the works, an additional sum of £20,000 would be expended. Both the work and the method of dealing with the cost had been absolutely necessary; and the shareholders could only be congratulated on the fact that increased earnings had allowed the management to keep abreast of the times. The balance carried to the net

revenue account was £85,189. A sum of £17,000 had been transferred to the reserve fund account to reinstate the fund, which was reduced during the half year by sums totalling to £16,926. The meter renewal fund similarly required replenishing to the extent of £2500, and gas-stoves had been credited with £3000—leaving a balance of £2623 to be carried forward. The Directors desired to express their thankfulness to all the staff, to whose ability and energy the increasing business of the Company was largely due.

Mr. E. J. WHITE seconded the motion; and it was carried.

It was subsequently agreed that a dividend at the rate of 5s. per share should be declared out of the profits for the half year.

AUSTRALIAN GASLIGHT COMPANY.

The Half-Yearly Meeting of the Australian Gaslight Company was held at the Offices in Sydney (N.S.W.) on Thursday, Jan. 30, under the presidency of Mr. GEORGE J. COHEN, the Chairman.

The SECRETARY (Mr. R. J. Lukey) having read the notice convening the meeting, the report of the Directors was taken as read. This stated that the profits for the half year to Dec. 31, after making provision for bad and doubtful debts, deducting interest on borrowed money, repairs and renewals, depreciation of plant, working expenses, and all other charges, with the balance brought forward, amounted to £72 868. The Directors recommended the payment of a dividend for the six months of 9s. per share on the old shares, and in proportion on the new shares, free of income-tax, which would absorb £60,000, leaving a balance to be carried forward to the next account of £12,868.

The CHAIRMAN, in moving the adoption of the report, said it afforded him much pleasure to again refer to the continued progress of the Company. Six months ago, he had expressed the hope that the increase in the consumption of gas then reported would be maintained. This had not only been accomplished, but the result had exceeded his most sanguine expectations. This was the more pleasing, inasmuch as the increase was a reliable one, based upon a steady extension of business, and not due to spasmodic efforts on the part of the Company or the consumers. The consumption of gas during the past half year exceeded that of the corresponding period of the previous year by some 97,000,000 cubic feet; and for the year it was 179,000,000 cubic feet more, which was equal to an increase of 9·2 per cent. The Company's make of gas had now reached very large proportions; the quantity manufactured last year being 2,287,400,000 cubic feet, necessitating the consumption of 173,281 tons of coal and 961,450 gallons of oil. A considerable portion of this increase was the result of the extension of the penny-in-the-slot system; the houses fitted up to date numbering 26,600. This led him to the extensions in progress at Mortlake, which they were hastening to complete in time to meet the ensuing winter requirements. The extent of the present demand for gas necessitated every available bench of retorts at both works being brought into use. Owing to the strike of the Airlie miners, the Company were unable to obtain their supplies of crude oil from Lithgow for the manufacture of water gas. This had thrown nearly the whole manufacture of gas on the coal plant. Since they last met, the Directors had decided to extend the wharfage accommodation at Mortlake, to facilitate the unloading of coal at that station. The extension was now finished and ready for use; and, if required, 1000 tons of coal could be discharged daily by the cranes. The installation of public gas lighting in the Shire of Ku-ring-gai and the Municipality of Rookwood—the former in August, and the latter in December last—elicited manifest satisfaction on the part of the Councils and ratepayers concerned. Nothing advanced a district so much as well-lit streets; and he was specially pleased to congratulate the inhabitants of these districts on having come into line with the other suburbs by adopting incandescent gas lighting. During last half year, the Company closed the Bathurst Street and Haymarket branches, and opened a new and commodious office and show-room in the central part of the city, to meet the requirements of the consumers. The change had been much appreciated. The number of visitors had exceeded the attendance at the late branches combined; and there had been a marked increase in the sale of gas-cookers and other appliances. There was a fine display of up-to-date gas-fittings in the show-room; and consumers were cordially invited by the Board to inspect them, as well as to attend the cookery lectures which were given weekly by a competent lady lecturer. The opening of the New Central Railway Station being the reason for the closing of the Haymarket branch—the customers now being taken past that office, and the property having been greatly depreciated in value—it seemed to him out of all reason for the Commissioners of Taxation to raise the unimproved value of the Company's land in that part of the city by 100 per cent. Against this assessment the Board immediately lodged an appeal. The new Federal Tariff would affect gas companies more than others; for the greater portion of the machinery and other material used in the manufacture of gas must be imported, as it was not made in the Commonwealth. Naturally, then, they had kept a careful watch over the proceedings in the Federal House of Representatives while the Tariff Bill was under consideration. Though it emerged from that House more favourable to gas companies, as regarded taxation, than when the Treasurer first presented it to the members, it still left much to be desired. The Directors were not without hope that the Senate would still further improve the measure in the direction desired by gas companies, and above all see that undue preference was not conceded to suppliers of electricity, as was at first contemplated. These extra duties had added considerably to the Company's expenses. For some years past, they had had to meet new and increased charges in every direction; and these had become a very heavy burden to bear. Thus, while on the one hand the revenue had of late shown considerable expansion, the expenditure had correspondingly increased—thus leaving the Company no better off financially at the end of each year. One exceedingly satisfactory feature was that though the revenue of the Company had been steadily increasing of late years, the bad debts had been decreasing. With a revenue of £457,711, they only amounted to £975 (equal to 0·2 per cent.) during the past year. The activity in building which had existed for some time past in the city and suburbs within the area supplied with gas by the Company had kept them exceedingly busy in all departments, in order to cope with the demand for mains and services. The consumers, for instance, now exceeded 80,000, showing an increase for the half year of 2900. This alone had necessitated the laying of 60 additional miles of mains and service-pipes; the total mileage now being 2227. Public lights showed an increase for the half year of 342; the number erected to date being 10,882. The gas-cooker sales had reached the highest limit ever attained by the Company—743 having been disposed of during the half year, making the total number now supplied to the consumers 15,919. The consumption of gas during the day time was exceedingly satisfactory, and now equalled 44·7 per cent. of the total make. In conclusion, he remarked that the outlook in connection with the gas industry was still very bright; and it was evident gas was more than holding its own.

The DEPUTY-CHAIRMAN (Mr. J. H. Storey) seconded the adoption of the report and the declaration of the dividend recommended; and the resolution was carried unanimously.

The Directors and officers were thanked for their services during the past half year; and the Chairman, in responding, specially referred to the efficient services rendered by the officers and staff.

SUNDERLAND GAS COMPANY.

The Annual General Meeting of this Company was held last Wednesday, at the Offices, Fawcett Street, Sunderland—Alderman STANSFIELD RICHARDSON in the chair.

The Directors reported that, in compliance with the resolution passed at the general meeting on the 4th of September last, to close the financial year in future on Dec. 31 instead of June 30, the accounts accompanying their report embraced a period of 18 months—from July 1, 1906, to Dec. 31, 1907. The revenue in that time amounted to £210,360, and the expenditure to £178,805; leaving £31,555 to go to the profit and loss account, the balance on which was £38,626. A dividend for the twelve months ending June 30 last was declared in September; and the Directors recommended one of 5 per cent. on the original stock and of 4½ per cent. on the additional stock (less income-tax) for the six months ending Dec. 31.

The CHAIRMAN, in moving the adoption of the report, mentioned that the number of shareholders was now 535, against 536 in 1907 and 535 in 1906. The Company had, he said, for a long period paid the maximum dividend, and could still do so. They had had a fairly good time during all these years, thought they had had their ups and downs. They were sharing now in the great depression prevalent in Sunderland. With all the shipyards doing little, and associated trades slack, there had naturally been a falling off in the demand for gas, especially for power. For gas for lighting and heating purposes, however, the demand was fully maintained. The report and accounts, as mentioned in the former, embraced a period of eighteen months; and comparing this with the similar previous period, the Company showed an increased business of 62 million cubic feet. The number of meters had been increased by 963, and of slot meters by 2112. At present, there were 13,670 of the latter in use; and they proved a great convenience to many people, and good business to the Company. A favourable contract for reconstruction and renewals at the Ayres Quay works had been entered into, and it was hoped that the Company would within twelve months be in a position to meet all present and future demands there. At Hendon, the works were in need of renewals and of some extensions. They were now experiencing the highest prices for coal, and were looking forward to some reduction. But there seemed some uncertainty, as coalowners told them that if the Eight Hours Bill passed it would add to the cost of production; and he believed it would. With a slackening trade, however, they were hopeful of being able to make a contract on better terms than at present. Their anticipations that coke and other residuals would help them had been realized; and it was probably due, in large measure, to careful management that they had, during the last twelve months, obtained a better production of gas from every ton of coal carbonized.

The VICE-CHAIRMAN (Mr. Austin), in seconding the motion, said they had not forgotten that they were a commercial company, without the rates at their back to protect the shareholders if they made a mistake. But, in spite of every competition, including electricity, which had the rates behind it, and which he thought was unfair competition, they were in a satisfactory position.

The motion was carried unanimously.

In reply to a shareholder, who suggested that the Company were taking a serious risk in not insuring against compensation,

The CHAIRMAN said the Directors would again review the matter, though they were unanimously of the opinion that they were taking the right course; £4768 16s. being a very substantial sum set aside (as shown by the balance-sheet) for compensation to workmen.

The dividends recommended in the report were then declared, and the retiring Directors re-elected.

Mr. S. J. DITCHFIELD (a Director), in returning thanks, expressed his regret that their able and esteemed Manager, Mr. John H. Cox, was prevented by illness from being present. It was the first meeting Mr. Cox had missed for forty years. He moved that a resolution be conveyed to him expressing their regret and sympathy with him in his illness, and hoping that he would soon recover.

The CHAIRMAN seconded the motion. They fully appreciated Mr. Cox's long and faithful services to the Company. His great experience, and his ability, assiduity, foresight, and judgment, had been valuable to them, and he and his assistants, including his son (who was present), shared in whatever credit the Company had obtained.

The motion was carried; and the proceedings closed with a vote of thanks to the Chairman.

The Llanelly Urban District Council have decided to promote in the next session of Parliament a Bill for the extension of existing facilities for the supply of water, extension of the area of supply, for provisions in respect of filtration, regulations for the prevention of pollution in the catchment area, and for other purposes.

HARROW AND STANMORE GAS COMPANY.

The Ordinary Half-Yearly General Meeting of this Company was held at the Holborn Restaurant on Monday, the 2nd inst.—Mr. A. H. Baynes, F.R.A.S., in the chair.

The Chairman said the proprietors would, he knew, be very sorry to hear that Mr. Chapman, their Engineer and Secretary, was suffering from the prevailing epidemic. He felt he might assure Mr. Chapman, in their name, that he had their sympathy, and earnest hope for a speedy and complete recovery.

The notice convening the meeting having been read, the report of the Directors, with the accounts for the half year ending the 31st of December last, was presented.

The Chairman, moving the adoption of the report, said he thought the proprietors would agree with him that it was a most satisfactory document. It showed progress all along the line; and he considered it reflected great credit upon their Engineer. Comparing the results of the past six months with those for the corresponding half of 1906, the gas-rental had amounted to £14,701—or £1518 more; and the make of gas had been 86,907,000 cubic feet, or an increase of 9,847,000 cubic feet, of which 62,194,000 cubic feet had been coal gas. The quantity of coal carbonized was 5638 tons; and the yield of gas per ton of coal was 11,031 cubic feet. They made 24,713,000 cubic feet of oil gas; the oil used being 58,811 gallons, or at the rate of 2·42 gallons per 1000 cubic feet. The total quantity of gas sold during the half year was 79,622,000 cubic feet—an increase of 11 millions, or just over 16 per cent. Harrow and the district accounted for 6,475,000 cubic feet; Sudbury and Harrow Weald, 3,177,000 cubic feet; and Stanmore and the district, 1,629,000 cubic feet. Coke and residuals had produced £2883; being an increase of £873. Rentals of meters, stoves, and fittings brought in £1407, or £227 more than before. The receipts for tar increased by £159, and those for sulphate by £80. Had it not been for the reduction of 2d. per 1000 cubic feet, which had taken place throughout the whole of the Company's area of supply, the increase in the receipts for gas would have been considerably in excess of the actual amount, £2182. There had been 482 new services laid for ordinary consumers, and 495 for those using prepayment meters during the past year. The present number of ordinary consumers was 3150, of prepayment consumers 2970—total 6120; of cooking-stoves 3205, and of public lamps 1110. Turning to the expenditure side of the account, there was an increase of £1842 compared with the second half of 1906; 1012 more tons of coal having been carbonized, at a cost of £1520. Purification cost more by £37. The amount spent on repairs to works had been higher by £522, but in respect of mains it had been lower by £115; and £20 had been added to the workmen's insurance fund. The total profit for the half year was £5718, an increase of £791. The dividend recommended would take £4405; interest on debentures and loans, £657; and the Directors were proposing to place £582 to a reserve fund. This would leave £73 7s. 10d. to be added to the previous balance; making the total amount carried forward, £3639. The capital expenditure per 1000 cubic feet of gas sold at the close of the year was 22s. 1d.; whereas on Dec. 31, 1906, it stood at 23s. 4d.—a reduction of 1s. 3d. per 1000 cubic feet on capital account. There was now due to the Company, on account of the reduction of 3d. per 1000 cubic feet in the price of gas, £291 for the six months ending June 30 and a like amount for the half year to Dec. 31; making a total of £582. This, the Directors advised should be placed to a reserve account. Hitherto they had not had such an account; but now that they were paying the statutory dividend, they were able to commence one with £582. It would be seen that there had been an increase in almost every direction during the past half year; and he thought they began the current year with every prospect of still further progress and prosperity.

The Vice-Chairman (Dr. J. W. Lee Glaisher, F.R.S.) seconded the motion; and it was carried unanimously.

Dividends at the rates per annum of 10 per cent. on the original "A" capital and 7 per cent. on the additional "B" and "C" capital and the guaranteed shares, all less income-tax, were declared; and it was resolved to place the sum of £582 to a reserve fund.

Mr. A. F. Phillips, M.Inst.C.E., was then unanimously re-elected a Director, and Dr. C. E. Goddard an Auditor of the Company.

Mr. Cutler proposed a hearty vote of thanks to the Chairman, Directors, and officers, for their able management of the Company's affairs. He thought the shareholders might congratulate themselves upon the progress of the Company.

Mr. Church expressed his pleasure in seconding the motion. He remarked that while the Chairman had pointed out the increases, he had omitted to call attention to a decrease. On looking through the accounts, he (Mr. Church) found that the leakage had been reduced by nearly 4 per cent., which was exceedingly satisfactory.

The motion having been carried,

The Chairman, on behalf of his colleagues and himself, said they much appreciated the confidence reposed in them by the shareholders, and he was quite sure the staff would be gratified for the cordial recognition of their services.

The proceedings then closed.

Gas Profits at Belfast.—A deputation having waited upon the Belfast Gas Committee from the City Council asking for a grant of £15,000 out of the profits of the gas undertaking in aid of the rates, the Chairman (Mr. J. A. Doran) said since the Corporation took over the gas-works in 1874, the Committee had handed over to the various departments of the Corporation the sum of £226,952, including £47,000 this year, made up as follows: In aid of rates, £109,264; new City Hall, £65,424; Electricity Committee, £32,500; Parks Committee, £3813; Library Committee, £9550; temporary Albert Bridge, £3500; cost of Electric Lighting Order, £607; cost of Finance Bill, £994; Albert Memorial clock dials, £300. This showed the wisdom of those who took part in the purchase of the works, and those who now conducted the concern, and was a standing memorial to their capacity as men of business. It was resolved that the grant asked for be made.

PROVINCIAL GAS COMPANIES.

A "Modest Course of Progress" at Aldershot.

In the report presented at the recent half-yearly meeting of the Aldershot Gas and Water Company, the Directors stated that the total revenue for the six months ending Dec. 31 last was £30,833, and the expenditure £23,564; leaving a balance of £7269. They recommended dividends for the half year at the following rates per annum: £11 19s. per cent. on the "A" shares, £8 19s. per cent. on the "B" shares, and £7 per cent. on the "E," "F," and "G" ordinary shares—all less income-tax. The Chairman (Mr. A. F. Wilson), in moving the adoption of the report, first dealt with the general outlook of undertakings interested in the condition of the coal market, and then turned to their own Company. Their business had, he said, followed what he might call a modest course of progress. He found that the consumption of gas for the past half year in all their districts had increased by upwards of 4 per cent. as compared with the corresponding period of 1906. But when he said 4 per cent., he was at the same time bound to confess that things had been a little more satisfactory than this figure indicated. For instance, in their out-districts, several parts of which were still but sparsely populated, they found that the increase was something considerably more than in the congested centres of Aldershot, which included contracts made with the knowledge that the quantity of gas consumed year by year and six months by six months was more or less a fixed quantity. But, taking their whole district, the average increase was 4 per cent.; and this he considered was very satisfactory indeed. The Company's total revenue from all sources was slightly higher than that of the corresponding period of last year, and had progressed at the rate of about £1000 per annum. This was not very great, but still it was something. What was more, it was steady; and it had been made up by certain increases in districts which gave even greater promise for the future. Part of the revenue, as the proprietors were aware, was derived from water. From private rental, the amount received was much the same as in the latter half of 1906. The public rental had fallen off slightly; and the special contract with the Government had, he was sorry to say, dropped by quite £100. These changes might, perhaps, be traced to the larger rainfall of the past six months. However, he had a congratulatory note to sound. Their wells continued at the level they had maintained for many years—in fact, they were higher than they had ever been; and after 26 years' working, he considered this was a very satisfactory statement to make. There was always the danger, in supplying any community, and especially such a place as the Camp, that the supply might fall off. But, after 26 years' experience, it was a very strong and also a very important statement to be able to make, that their supply at the present time was as good as, if not better than, it was at the start; and yet their pumping now was double or treble what it was then. Mr. A. Brown seconded the motion; and it was carried unanimously. Mr. C. P. Crookenden (one of the Auditors) having moved a vote of thanks to the Chairman, Directors, and staff, it was carried, and acknowledged by Mr. W. T. Robertson for the former and by Mr. R. W. Edwards, the Secretary and General Manager, for the latter.

Reduced Price and Increased Capital at Cheltenham.

At the annual meeting of the Cheltenham Gas Company on Monday last week, at which the Directors recommended the declaration of the statutory dividend of 5 per cent., the Chairman (Mr. R. Ticehurst) stated that the gross revenue from all sources during the past year amounted to £72,041, and the expenditure to £57,235, which left a gross profit of £14,806. There was a sum of £13,689 in hand, subject to the half-year's dividend now to be declared. A slightly increased amount had been obtained for residuals, mainly coke. Notwithstanding the great advance in the price of coal, particularly during the later months of the year, the additional cost for the whole year was only £375 compared with 1906. This was to be attributed to the reduced expenditure on manufacture. Answering complaints which had been made as to the quality of the gas, the Chairman said that, under the altered system, quite so high a quality could not be expected as formerly; but it was just as good as that supplied in London, Paris, Berlin, and Vienna. He concluded by announcing a further reduction of 1d. per 1000 cubic feet in the price of the gas, involving a saving to the consumers of £5600 a year. With the discount allowed, the actual price of gas would be less than 2s. per 1000 cubic feet; and there were not many towns in the kingdom which could boast a lower figure than that. The motion was carried; and the half-year's dividend was declared. An extraordinary meeting followed, at which, on the proposition of the Chairman, it was resolved to authorize the Directors to raise further stock to the amount of £25,000, to rank *pari passu* with the existing consolidated ordinary stock of the Company.

A Record Year at Elland.

An interesting review of the past year's work of the Elland Gas Company was given by the Chairman (Rev. G. E. Aspinall) at the recent annual meeting. He said the gas sold had reached a total of 121,076,800 cubic feet, which was an increase of 8,966,400 cubic feet, or at the rate of 8 per cent., on the quantity sold in 1906. If they deducted 7 millions from the total, as due to the extensions of the works which had been carried out, there still remained an increase of 1,976,400 cubic feet. It was a record year for the sale of gas by the Company. The amount realized was £14,746, against £13,763; being an increase of £983. The income from residual products had increased by £486, due not so much to better prices as to larger quantities made. These were, broadly speaking, the chief features of the income side of the accounts. With regard to the expenditure, there was not much to be said. The balance carried to the profit and loss account was £5829; and the amount available for distribution was £7556. As showing the progress of the Company, he might mention that 123 new ordinary meters and 53 new prepayment meters had been fixed during the year. The consumption of gas for ordinary lighting had increased 7 per cent., for public lighting 20 per cent., and for prepayment meters 7 per cent. The demand for cookers, grillers, and washing-boilers had been well maintained. He thought they could claim that they had had a fairly successful year. They had been able, in spite of the rise in coal, to

avoid raising the price of gas, which still remained at 2s. 6d. per 1000 cubic feet, though he would like to point out that the increased price of fuel, had they charged it to the consumer, would have meant his paying 3d. per 1000 cubic feet more than he was now charged. Most people were of opinion that coal would be cheaper. They hoped this would be the case; but the Bill now before Parliament, to limit the hours of miners to eight per day from bank to bank, which would make 6½ hours' working, would, if passed, certainly not tend in this direction. The output of coal would necessarily be limited, and consequently the price enhanced. Mr. R. Thornton seconded the motion; and it was carried. A dividend of 7¼ per cent. was then declared. The Chairman and the other Directors were thanked for their services, as were also the Engineer and Manager (Mr. Robert Porter) and the staff. Subsequently an extraordinary general meeting was held, at which it was decided to borrow on mortgage £5618.

A Record Year at Enfield.

In moving the adoption of the report and accounts (which showed a net profit on the half-year's working to Dec. 31 of £5267) at the meeting of the Enfield Gas Company, Colonel Sir Alfred Somerset, K.C.B., said the quantity of gas sold during the past six months increased to a larger extent than in the corresponding half of the previous year; while the profit would allow, after payment of the dividends, of a substantial sum being added to the undivided profit. The Board had had to deal with an attempt to raise the assessment of the undertaking in the parish of Enfield for the purposes of local rates from £3000 to £6002—an advance so extravagant, and in the view of the Board so unjustifiable, that they were determined to resist it by an appeal to Quarter Sessions if necessary. Upon the lodging of the objection, however, the Assessment Committee referred the matter to their valuer; and the Company's case was of such strength that they were subsequently able to effect a reduction from £6002 to £4100, at which amount the assessment now stood. It had become imperative for them to provide an additional gasholder; and drawings were being prepared for the building of one of a capacity of a million cubic feet. Additional capital would need to be raised for this purpose. Mr. Alfred Ford seconded the motion, and, dealing with the details of the accounts, said that, compared with the corresponding period of the previous year, there were 876 more consumers connected to the mains, and 618 more cookers in use. The consumption of gas had increased by 10·78 per cent., representing 9,683,600 cubic feet. The increased business entailed, of course, higher expenditure, first of all for the raw material, coal, of which 592 additional tons had been carbonized, and then for the purification and distribution of the resultant gas. The plant, both manufacturing and distributing, as well as the meters and cookers fixed in the district, had been well kept up. The increased assessment referred to by the Chairman was largely responsible for the addition of £138 to the charge under the head of rates and taxes. In looking at the rental for gas, it would be seen that the receipts for private lighting were £1085 more; while public lighting had brought in £247 less than last year. In both classes, reduced prices per 1000 cubic feet had been in operation. Rental of meters, stoves, and fittings had grown by £271; and residuals had returned more, by reason of the increased quantity of coal used and better market prices, by £854. After some congratulatory remarks by several proprietors, the resolution was passed; and a dividend at the rate of 5 per cent. per annum on the consolidated preference stock, and of 5½ per cent. per annum on the consolidated ordinary stock was declared. Mr. Fitch said he was surprised to find so many of the obviously unfair and often exposed and discredited statements with regard to the relative merits of gas and electricity were still current. Take, for instance, the question of cost. It was by no means uncommon for those who favoured the electrical interests to compare the newest electrical lamps, fixed in the best position for illumination, with old flat-flame and uncared-for gas-burners, put in positions without the slightest regard to useful effect. Authority after authority could be quoted proving that, light for light, gas used with a decent incandescent burner, and with the smallest judgment, was many times cheaper than electricity, its diffusive power beyond question greater, and the quality of the light much softer, and consequently less injurious to eyesight. He had before him two instances of the saving effected by easily-made rearrangements of gas lighting in churches. Both had accepted the proffered advice of this Company; and in one case the saving in gas amounted to 69 per cent. for the first year under the new conditions, and 71 per cent. for the second year. In the other case, alterations were made about a year ago, so there were only three-quarters of a year, including but one dark quarter, for the purposes of comparison; but the saving realized there was at the rate of 53 per cent. for that time. The services of the Directors were the subject of the vote of thanks to which Dr. J. Collyer responded; and the work of the principal officers and the staff was acknowledged in a similar way and responded to by the Secretary and General Manager (Mr. C. W. Offord), who pointed out that the results for the complete year showed that 1907 had been a record one in several particulars—*i.e.*, in the increased sale of gas, the increased make of gas per ton of coal, the low percentage of unaccounted-for gas, and the greater quantity of gas sold per unit of capital employed.

Good Results with Adverse Conditions at Harrogate.

At the annual meeting of the Harrogate Gas Company, the report of the Directors opened with an expression of regret at the loss they had sustained by the death of their late colleague, Mr. Samuel Hornby, who had been a member of the Board for 35 years, during the last 11 of which he occupied the position of Chairman. Passing on to the working of the undertaking in the past year, the Directors said the profit shown by the revenue account was £15,675. It was proposed to appropriate £5040 in payment of dividends at the same rate as before, place £681 to the reserve, and carry forward the balance. According to a statement of the gas made, sold, &c., last year, prepared by the Secretary and General Manager (Mr. H. Wilkinson), the quantity made was 285,530,600 cubic feet, of which 256,178,000 cubic feet were sold—124,365,900 cubic feet by ordinary meters, 85,243,500 cubic feet for stoves, &c., 2,982,000 cubic feet by weekly meters, and 43,586,600 cubic feet by prepayment meters—and 10,239,400 cubic feet were used for public lighting; making a total of 266,417,400 cubic feet. The Chairman (Mr. F. Barber), in moving the adoption of the report, said it was with much satisfaction that the Directors found, at the expiration of the year, that the management had succeeded, in the face of many adverse conditions, in achieving such excellent results. An increased yield of gas per ton of coal carbonized had met in some measure the advance in the price of coal, but not to the full extent anticipated, owing to the difficulty experienced in obtaining satisfactory supplies. There had been an expansion of business in all departments; the increased consumption of gas being 9,118,900 cubic feet. The year's working, as stated in the report, showed a profit of £15,675; and there was a sum of £2465 to add to the balance at the credit of the net revenue account. Referring to the Mines Eight Hours Bill, he said the gas industry had serious apprehensions as to the effect which it would have if passed. The Chairman concluded by briefly referring to the construction of the Company's light railway, the contract for which had been let to Messrs. Holme and King, Limited, who commenced the work on the 25th of April last. Mr. S. Spencer seconded the motion; and it was carried unanimously. Dividends at the same rate as last year were declared; and the proceedings closed with a vote of thanks to the Chairman, Directors, officials, and staff.

Cheap Gas and Greater Consumption at Ilford.

At the recent half-yearly general meeting of the Ilford Gas Company, the Chairman (Mr. Wm. Ashmole), in moving the adoption of the report and accounts, said they showed the satisfactory condition of the Company. This was not only gratifying to the stockholders, but also to the officials and staff, and especially to the new Manager (Mr. W. B. Farquhar). It enabled the Directors to recommend an increased dividend of ½ per cent. on all classes of stock. The reduction in the price of gas which took effect from the beginning of last year had fully justified itself in the increased consumption which had followed. It had enabled the Company to popularize the use of gas-fires, gas-irons, gas-coppers, and other forms of apparatus. It might be thought that a reduction in the price of gas must necessarily mean reduced revenue; but this was not the case. It was a remarkable fact that the cheaper they sold the gas the more the consumer would use it; and this, he was pleased to say, had been their happy experience in Ilford, which fully warranted reductions whenever possible. Turning to the report and accounts, the continued growth of the Company was shown by the quantity of gas sold, which for the past half year was equal to 14·95 per cent. over the corresponding half of the previous year. This increased consumption had not altogether been gained by means of new consumers, but a portion of it was due to the old consumers taking advantage of the improved and many varied ways of adding comfort to their home life, in the shape of gas-fires, &c. It might interest the stockholders to know that, after a number of trials, the Directors had prevailed upon one of the local builders, who was putting up new houses, to try as an experiment the fixing of a gas-cooker and a gas-copper in the scullery, and instead of the usual kitchener in the kitchen, having an ordinary room fireplace, thus converting the kitchen into a nice sitting-room. He (the Chairman) understood that the builder was very well satisfied with the appearance of the houses when finished; and as all cooking, washing, and water-heating was done by gas, it would naturally mean a considerable increase in the consumption. The Directors were following this experiment with great interest, and hoped before long to see the majority of new houses arranged in this particular style. Turning to the accounts, under the heading of "Manufacture," coal had cost more than in the corresponding half year. This was due, in the first place, to the advanced price which the Company, along with others, had had to pay; and, in the second, to the purchase of a large quantity last summer in anticipation of coal troubles—the extra handling and the storing of this coal also telling to an extent on this item. The other items remained at a normal figure, with the exception of purification, which showed a considerable saving. On the credit side of the revenue account, the sales of gas, notwithstanding the reduction in price, showed a revenue of £24,486, against £23,166 for the corresponding half of 1906; or an increase of £1320. The rental of meters, stoves, and fires produced a revenue of £2815, compared with £2513, or an increase of £302; and residual products yielded £7436, against £5369, or an increase of £2067. In conclusion, the Chairman expressed the wish, which he was sure would be echoed by the Board and stockholders present, that the Company would go on prospering and extending in the same successful manner that they had done in the past. The report and accounts were adopted, and dividends for the past half year at the rates of 6½ per cent. per annum on the "A" and "C" stocks, and 5 per cent. per annum on the "B" stock (less income-tax) were declared; being an increase of ½ per cent. per annum upon the rates of dividend paid for many years past. Votes of thanks to the Directors, officers, and staff concluded the meeting.

Bright Prospects at Margate.

At the annual general meeting of the Isle of Thanet Gas Company, the Chairman (Mr. L Hart, J.P.), in moving the adoption of the report and accounts, congratulated the shareholders upon them. He said the past year had been a very trying one for the Directors, as coal had been at such an inflated price. But they had not lost their heads. Anticipating a fall, they had waited before purchasing coals, and their hopes had been realized; thus enabling them to continue supplying gas at the present low figure. The illuminating power had been kept at a very high standard. They were required by their Act of Parliament to supply 15-candle gas; but during the past twelve months they had kept it at an average of 16-candle power. He had found that people were much astonished at the low price of gas at Margate; and when they considered that gas was now very largely used for cooking as well as lighting, they would see what a difference the charge for it made. The Company had been fortunate enough to sell a larger quantity of gas during 1907 than ever before—a fact which proved that the Directors were meeting with success in their endeavours to push the business of the Company. He might be asked what they were going to do during the present year. In reply to the question, he would say they looked forward to a better year than the last. Coals were cheaper for one thing; and with regard to the electric light question, he had lately

read that the chairman of an electric light undertaking was bemoaning the fact that even his preference shareholders would not be likely to get a dividend for many years, owing largely to the energetic manner in which gas undertakings were being managed. He would say that the prospects of the Isle of Thanet Gas Company were as bright as the light they supplied. The Directors did not wish to take to themselves the credit for all the favourable results of the past year. They had an excellent Secretary and Engineer, their collectors were model ones, and the whole staff deserved the thanks of the shareholders. The report was adopted, and a dividend of 5½ per cent. per annum was declared. A vote of thanks having been accorded to the Directors, a similar compliment was paid to the Secretary (Mr. T. C. Fuller), the Engineer (Mr. F. A. Winstanley), and the staff, for their work in the Company's interests during the year.

Extended Area and Good Progress at Redhill.

At the recent general meeting of the Redhill Gas Company, the Directors reported that the business continued to show satisfactory progress. The total number of consumers was 3824, and of cooking and heating stoves on hire 2257. The new retort-house had been brought into use during the winter, and renewals and alterations of some of the plant had been made in the course of the year. The main extensions mentioned in the last report had been carried out. The villages of Walton-on-the-Hill and Lower Kingswood were supplied with gas early in the year; and the return from this extension was already satisfactory. The audited accounts showed, after payment of debenture interest, a balance of £8864 available for distribution, out of which the Directors recommended a dividend of 10 per cent. on the share capital, and 5 per cent. on the "B" stock, both less income-tax; leaving a balance of £1383. The Chairman (Mr. G. R. Hunt), in moving the adoption of the report, said the Company could congratulate themselves on the satisfactory working of the past year, taking into consideration the increase in the cost of coal and oil, and the upward tendency of rates and taxes. For the latter half of the year, the Directors were compelled to raise the price of gas 2d. per 1000 cubic feet owing to the exorbitant demands of the coal owners; but even this increased return did not nearly meet the extra cost of production. The Directors hoped, however, that the new contracts would be made at a more favourable figure, which would enable them to lower the price of gas. As intimated at the preceding annual meeting, the Directors had undertaken to supply gas to Lower Kingswood and Walton-on-the Hill; and the shareholders would be pleased to know that this work was carried through early in the year, and that the return, as mentioned in the report, was already satisfactory. The Directors also had in view further considerable extensions of mains in outlying districts, from which they had recently received applications; and it was estimated that the return from them would be equally profitable. Proceeding to deal with the principal items in the accounts, the Chairman reminded the shareholders that there had been a rearrangement of the duties of the two chief officials, and that twelve months ago Mr. Paterson was appointed General Manager, and Mr. Long had succeeded to the secretaryship. He was pleased to report that this new arrangement was working in a very satisfactory way. The Manager had been enabled to give more time to the supervision of the various important extensions which had been undertaken both in the works and the district; while with regard to the Secretary and his staff, the economical and efficient working of the office was highly creditable, and was largely due to careful organization on the part of Mr. Long. The Vice-Chairman (Mr. W. L. Stenning) seconded the motion; and it was carried unanimously. The retiring Directors and Auditor having been re-elected, votes of thanks were accorded to the Chairman and Directors, as well as to the officers; Mr. A. W. Oke remarking, in proposing the latter vote, that the fact that £5000 worth of the Company's ordinary stock had been sold at £102 11s. 8d. at a time when the Bank rate was exceedingly high, seemed to him not only a vote of confidence in the Board but also in the Manager and Secretary. The Chairman also eulogized the whole-hearted way in which the officials carried out their work and sought to extend the business of the Company. The General Manager (Mr. J. Paterson, M.A.) having acknowledged the vote on behalf of his colleague and himself, the ordinary business closed. A special meeting was then held, at which the Directors were authorized to create and issue £15,000 of ordinary "B" stock, and to exercise the borrowing powers of the Company in respect thereof.

A Prosperous Half Year at Stretford.

There was only a moderate attendance of shareholders at the half-yearly meeting of the Stretford Gas Company on Monday last week, when the Directors reported that the profit realized in the six months ending the 31st of December was £5132, and that the amount available for distribution was £7655. The Chairman (Mr. W. L. Galloway), in moving the adoption of the report, said the amount required to pay the statutory dividends was £4910, which would leave £2745 to be carried forward. He explained that the satisfactory condition of the accounts was due to economies in working, buying well, higher returns from residuals, and a large increase in the quantity of gas sold. It was a gratifying feature that the consumption had augmented so much that it had already overtaken the loss occasioned by the sale of the Chorlton-cum-Hardy area to Manchester; the figures being: 1905 (with Chorlton), 343,238,000 cubic feet; 1906 (partly with Chorlton), 334,052,000 cubic feet; and 1907 (without Chorlton), 344,902,000 cubic feet. The quantity of coal carbonized in the half year was 12,851 tons, with an average yield of 10,995 cubic feet per ton. The quantity of gas oil used was 92,399 gallons, and of benzol 1953 gallons. The proportion of carburetted water gas made was 18·6 per cent., and the maximum sent out in any one week 24·38 per cent. There was an increase of 198 in the number of ordinary meters in use, of 363 in prepayment meters, and of 937 in grillers; but a decrease of 13 in cookers. Under a revised scale of charges, it was hoped that there would be a greater number of cookers in use during the present year. The new mains laid during the six months had been 4666 yards, of which 1549 yards had been enlargements. The Deputy-Chairman (Mr. W. A. Nicholls) seconded the motion; and it was carried unanimously. On the motion of Sir Bosdin T. Leech, seconded by Mr. E. Hibbert, the statutory dividends were declared. The services of the Directors having been acknowledged, Mr. Nicholls proposed, and Mr. J. Slyman seconded, a vote of thanks to the officers, who, he said, had well earned it by their assiduous attention to their multifarious duties. In putting the resolution, the Chairman informed the meeting that the Engineer (Mr. H. Kendrick) had just retired from the position of Hon. Secretary of the local Institution of Gas Engineers, had been elected Vice-President, and had been the recipient of a handsome testimonial from the members as a mark of their appreciation of his services. He had also been one of the Secretaries of the successful Gas Exhibition lately held in Manchester, which no doubt had a most beneficial effect on the sale of gas in their area. Mr. Kendrick briefly returned thanks for the vote; and this brought the meeting to a close.

Lower Price and Larger Sales at Tunbridge Wells.

In the report for the year to Dec. 31 which was presented at the recent annual meeting of the Tunbridge Wells Gas Company, it was stated that the reduction in the price of gas had been followed by a satisfactory increase in the sales. Reference to the profit and loss account would show that, after payment of an interim dividend at the rate of 12, 9½, and 9 per cent. on the respective stocks in the Company for the half year ended June 30, together with the interest on the debenture stocks and temporary loans to Dec. 31, a balance of £19,082 remained unappropriated. The reduction of 2d. per 1000 cubic feet in the price of gas for the past year admitted (under the sliding-scale) of an additional dividend of ½ per cent, being paid on each class of stock in the Company; and the Directors recommended the declaration of a dividend for the past half year at the rates of 12½ per cent. per annum on the £20,000 consolidated ordinary stock, 10 per cent. per annum on the £30,000 consolidated "B" stock, and 9½ per cent. per annum on the £71,000 consolidated "C" and "D" stock, together with an additional dividend on each class of stock at the rate of ½ per cent. per annum for the first half of 1907. This would absorb the sum of £6103 (after deduction of income-tax), leaving £12,978 to be carried forward to the next account. The Chairman (Alderman W. H. Delves) said he was very glad to be in the position to again congratulate the shareholders on a prosperous year. They did not quite pay the increased dividend out of the profit; but the amount required was only £200. A year ago, when they decreased the price of gas 2d. per 1000 cubic feet, he intimated that it would be close work to pay the extra dividend to which they were entitled under the sliding-scale entirely out of the year's profit. The price of coal, owing, he thought, largely to the taking off of the export duty, had been greatly increased to all consumers. They calculated at the beginning of the year that the extra cost would be 2s. 6d. per ton, but it had been rather over 3s.; so that the profit calculations were also a little bit out, and it had been necessary to utilize £200 of the sum carried forward in order to pay the extra dividend. The business of the Company had gone on satisfactorily increasing during the year. The new consumers numbered about 370, which was highly encouraging for a Company that had been in existence for 64 years—especially as one noticed there were more empty houses in Tunbridge Wells than it was nice to see. The stove business was now getting quite an important feature. The increased cost of carbonizing materials was £2336. This was owing chiefly to the increased price of coal and oil; but some of it was owing to the extra quantity. They had used about 257 tons more coal, and nearly 15,000 gallons more oil, which latter accounted for £400 of the increase. In 1906, the cost of coal averaged 15s. 3d. per ton, and in 1907 16s. 8d.; but happily in the early part of last year they had a good stock in hand. The present price was 19s. per ton. The price of oil had also gone up from 3d. to 3¼d. per gallon; and they used something like 200,000 gallons a year. Fortunately, the increased price of carbonizing materials was set off considerably by the higher price of coke. Per 1000 cubic feet of gas sold, the cost of materials was nearly 1½d. more; but this was reduced by the enhanced value of residuals by 1d. The net cost was therefore ½d. per 1000 feet extra. The increased sale of gas was 10 million cubic feet, or 3½ per cent. The reduction in price meant a loss of £2250. The actual diminution in revenue was £930; and the difference between this sum and £2250 was made up by the extra sale of gas. The rental of stoves showed an increase of £80, and meters £120. Subsequently the Chairman gave some comparative figures, for the purpose of showing the progress made by the Company in the last twenty years. He said that in 1887 the total revenue receipts were £28,403, and the price of gas 3s. 6d. The income last year was £53,000. The rental of meters in 1887 was £286; now it was £1805. The rental of stoves was then £147; and now it was £1295. The capital spent at that time was £118,222; and now it was £183,000. The increase in capital in twenty years was 55 per cent. The gas sold in 1887 was 125 millions; and last year it was 283 millions. Therefore the increased sale was 125 per cent., though the increase in capital expenditure was only 55 per cent. This showed that they had practised great economy in spending money. Taking the comparison another way, the capital per 1000 cubic feet of gas sold in 1887 was 18s. 9d., and in 1907 12s. 9d. The dividend required per 1000 feet of gas sold was in 1887 1s. 3¼d. Last year it was just about 11½d., notwithstanding that they had increased the dividend as they had done. The report was adopted, and the dividends agreed to; and afterwards the Chairman, the Engineer and General Manager (Mr. Andrew Dougall), and the Accountant and Secretary (Mr. C. F. Catt) were thanked for their services.

Quality of the Gas in Leeds.—In the Leeds City Council, Mr. Connellan complained of the quality of the gas. He said he sympathized with the extraordinary difficulties which the Gas Committee had had to face; but he thought there was another duty than that of making a good profit on municipal undertakings. Mr. G. Ratcliffe, Chairman of the Gas Committee, admitted that occasionally the quality of the gas had fallen below the proper standard, but pointed out that this was owing to the difficulties they had experienced in regard to the supply of coal. Sometimes they had had to make use of coal of an inferior quality. On the other hand, he contended that they were making gas as pure as, if not purer than, any municipality in the country. The gas was not bad; it was good. But people did not know how to use it.

CAGLIARI GAS AND WATER COMPANY.

The Gas Concession.

The Ordinary General Meeting of the Company was held last Tuesday, at the London Offices, No. 11, Ironmonger Lane, E.C. Mr. W. R. GALBRAITH (in the absence of Sir John Aird, Bart.) in the chair.

The SECRETARY (Mr. W. B. Peat) read the notice calling the meeting; and the Directors' report and the accounts were taken as read.

The CHAIRMAN said, before he made any general observations on the affairs of the Company, he desired to say that he had been asked by Sir John Aird to convey to the shareholders his regret at not being able to be present that day. Sir John had not been very well during the inclement weather; and he had gone away into the country for a change. With regard to the accounts, he (the Chairman) was glad to say they were again satisfactory, and that the customary dividend and bonus could be declared, and the usual £1000 carried to the reserve fund. The principal recent event in the affairs of the Company was that the gas concession expired on Feb. 23; but at the request of the authorities in Cagliari, the Company had agreed to carry on the undertaking for another year. The negotiations for the renewal of the concession were in progress; and there was nothing particular in connection with the matter to announce to the shareholders that day. Mr. Simmelkjör, one of their colleagues, was at Cagliari; and he was personally meeting the authorities and discussing the question with them. Respecting the water-works, they had lately been engaged in scraping the trunk main. It had become rusted up; and so they had the main cleaned—the result being most satisfactory. The capacity had, in fact, been increased by 50 per cent.; and the delivery of water to Cagliari and the district had been greatly increased, and met all requirements. The balance of the cost of completing this work—viz., £653—had been debited to the maintenance of water-works account. The Directors desired to thank the officers and staff both in London and Cagliari for the careful way in which they had fulfilled their duties to the Company. The Directors still had as much confidence in the future of the Company as they had in the past. Therefore he had much pleasure in moving the adoption of the report and accounts.

Sir EDWARD BOYLE, Bart., K.C., M P., seconded the motion.

Mr. HERZHEIM asked whether the Directors had reasonable hopes of the renewal of the gas concession on terms satisfactory to the Company; and if the renewal was made, whether a new capital issue would be required.

The CHAIRMAN replied that the Directors were in frequent negotiation with the Town Council on the subject of the gas concession. Sometimes there seemed a prospect of a settlement, and then their hopes were again set back. All he could say at present was that Mr. Simmelkjör was at Cagliari, and negotiations were proceeding.

Mr. HERZHEIM: But is there any competition, or any alternative before the Council?

The CHAIRMAN answered that the position was this. Some little time ago, the Directors were in hopes that they had settled the matter amicably. Now there were some new members on the Council who had a little difficulty in meeting the views of the Directors; and the Directors had some little difficulty in meeting the views of the Council. His hope was that the matter would be settled satisfactorily; but if the result was adverse to the Company, it would not be the fault of the Directors. They had done their best. However, the agreement to carry on the works for another year gave them some amount of confidence of being able to arrive at terms with the Council. Replying to a further question, he said the concession governed both public and private lighting. If the concession was not renewed, there was nothing to prevent the Town Council establishing works of their own. In such an event, the Company would have to sell their plant to the Council, or dispose of it to other people; and then they would have to rely on their sinking fund, and what was realized from the sale of the works. The sinking fund had been calculated so as to give them sufficient to repay the original and present outlay on the works. That was how the matter stood. Their water concession would last for a long time; and therefore they were anxious to carry on both concerns as heretofore. But the Company could not force the Council to accept their views; nor could the Council force the Company to accept inequitable terms.

The motion was unanimously carried.

The CHAIRMAN proposed the confirmation of the interim dividend at the rate of 6 per cent., and the declaration of a dividend at the rate of 8 per cent. per annum for the past half year (less income-tax), together with a bonus of 5s. per share.

Mr. A. G. BURNEY seconded the proposition; and it was unanimously agreed to.

Moved by the CHAIRMAN, and seconded by Sir EDWARD BOYLE, the retiring Directors (Mr. A. G. Burney and Mr. S. Simmelkjör) were re-elected; and on the proposition of Mr. MALCOLM R. AIRD, seconded by Mr. HERZHEIM, the Auditors (Messrs. Turquand, Youngs, and Co., and Mr. R. S. Robb) were re-appointed.

Hearty votes of thanks were passed to the Chairman and Directors, and to the Secretary (Mr. Peat), the Manager in Cagliari (Mr. Sanna), their staffs, and the workmen.

Oldham's Reply to Complaints from Royton.—At a recent meeting of the Oldham Gas Committee, Mr. Arthur Andrew, the General Manager, stated that he had received a letter from the Royton Urban District Council, who alleged that they were being over-charged for gas. Mr. Andrew said he had replied to the effect that he had tested the consumption of 25 lamps in Royton (not specially selected) so as to see whether the Council were being charged too much. The lamps showed a consumption of 5½ cubic feet per hour, or 22 per cent. more than the stipulated quantity. The Royton lamplighters did not extinguish the lamps at the scheduled time; they were burning half-an-hour longer every morning than they ought to be. This was a serious matter. Then the burners were not kept in order; and if those in Oldham were in the same condition, he should describe them as a disgrace. If the Royton Council desired a deduction for the gas which had not passed through the burners owing to their bad condition, he thought the Committee should charge for extra consumption.

GAS v. ELECTRICITY FOR HEATING.

In the course of a letter to "The Times" on the subject of the mitigation of fog, Sir Oliver Lodge submitted four propositions to which he invited the consideration of the advocates of electricity for heating purposes. They were as follows:—

1.—That electricity is not an economical mode of generating heat. . . . For house warming it would be luxurious, but expensive.
2.—The existing prejudice against gas-fires is because many of them are bad in design or badly placed. Coal-fires are themselves also gas-fires, only the gas is made on the premises, and badly made.
3.—The same house-pipes which serve for lighting during a few hours would serve for heating if used continuously; light being otherwise obtained.
4.—Non-illuminating and cheap gas may have high heat-producing value.

These propositions formed the bases of the following observations by Mr. S. Walter, in a letter recently addressed to our contemporary.

Dealing with the first proposition, Mr. Walter said: "Before anyone is in a position to state authoritatively which mode of house-warming is economical and which is not, he must consider not only the actual cost of a unit of heat, but also the proportion of waste resulting from each method of production. He may even be permitted to go a step further and balance the disadvantages of one against the expense of the other; so may he incline to the opinion that the cheapest method is not necessarily the economical one. An enormous percentage (probably over 90 per cent.) of the available energy of coal as consumed in an open grate is totally lost, owing to the distillation of much of the volatile matter, which passes away unconsumed as smoke, the incomplete combustion of the remainder, and the escape up the chimney, in the form of hot gases and vapours, of a large proportion of the heat generated. If any form of heating be open to the charge of wastefulness, the modern fireplace easily heads the list, though the unit of heat so obtained is much cheaper than that produced by any other method. The open grate, then, may be dismissed as being by far the most wasteful, and attended by the greatest number of disadvantages; and we are left with, apparently, a choice between (1) some smokeless form of carbon fuel, such as anthracite, coke, &c.; (2) a hot-water system heated by gas; (3) gas-fires; and (4) electricity. With regard to the first, there is still the dirt, the exhaustion of the air of the room, waste of heat by the stream of hot gases which have to escape, and the necessity of the sweep. As to the second, the climate of this country is altogether too moderate to justify any such outlay as would be necessary. In regard to the third, the fact that they smell, exhaust and vitiate the air, and necessitate either stoves or chimneys, must detract materially from any virtues they otherwise possess. Until the chimney is done away with, we shall never be free from chimney-sweeps and down-draughts. With respect to the fourth, the actual cost of current consumed in a portable electric radiator burning four large lamps is from 1d. to 1½d. per hour; and considering the absence of any waste, the non-consumption of the atmosphere of the room, and the cleanliness, I submit that this method of heating has a well-founded claim to be called economical."

On the second proposition, Mr. Walter made the following remarks: "Would it not be more accurate to say that the prejudice against gas-fires is born of a dislike of the odours that emanate therefrom? At all events, the smells are no more agreeable because they happen to be made by faultily constructed fires. The second part of the proposition is clearly arguable. If coal-fires are nothing but gas-fires where the gas is made on the premises, and then badly, how would Sir Oliver Lodge explain the fact that a coal-fire continues to glow and give out great heat long after all flame—*i.e.*, gas—has disappeared, while the glow of a gas-fire departs immediately the supply of gas is shut off? The reason, as I suggest, is that the combustion of the glowing carbon continues long after the gases are driven off, and this is proved by the continually diminishing volume of glowing coals. This combustion cannot take place in a gas-fire, because no solid carbon is present."

Mr. Walter's remarks on the third proposition were: "This would at least necessitate reconstruction throughout, and severance of the pipes from the supply company's mains; while if an electric installation were contemplated for lighting, it would appear less expensive and troublesome to add another meter and cables for heating at the same time."

As to the final proposition, that "non-illuminating and cheap gas may have high heat-producing value," Mr. Walter said that on this point there could be no two opinions, but that "cheap" did not necessarily mean "economical;" and it had yet to be demonstrated that a small room could hygienically be heated by a gas-fire.

To Mr. Walter's statements respecting gas-fires, Mr. D. Milne Watson, the General Manager of the Gaslight and Coke Company, replied as follows:—

Mr. Walter says that gas-fires "smell, exhaust and vitiate the air, and necessitate either stoves or chimneys;" adding that, "until the chimney is done away with, we shall never be free from chimney-sweeps and down-draughts." If the chimney be thoroughly swept before a gas-fire is installed, the sweep will never be needed again for that chimney. The chimney materially assists the ventilation of a room, especially when an inlet into it is provided near the ceiling. In the majority of houses, it is the only means of ventilation other than that afforded by the doors and windows, which many people find it impossible to keep open in cold weather. It is therefore a drawback to the use of hot-water or electrical radiators that their installation involves the loss of the induced ventilation up the chimney afforded by coal or gas fires.

The idea that gas or coal fires "exhaust" the air of a room is obviously fallacious. Whatever air is consumed or carried away by such fires must necessarily be instantly replaced from without the room, as it is impossible to create a vacuum in any ordinary apartment.

It is usually considered to be an improvement to the hygienic condition of any room to instal a ventilating-fan to remove—or "exhaust"—the air periodically. Why is it a virtue to change the air of a room by a fan, and a vice to do so by means of a chimney with a fire as the motive power?

Gas-fires do not smell if properly constructed, properly fitted, and occasionally adjusted by competent workmen; and Sir Oliver Lodge is quite right in his remark that "the existing prejudice against gas-fires is because so many of them are bad in design or badly placed." This Company recognize that fact, and train their fitting staff in the proper fixing and subsequent adjustment of gas-fires. They have also organized a special staff to undertake the work of periodically overhauling and putting in order the gas-fires in use in their district. They will be very glad indeed to be informed of any gas-fires used by their consumers which are not giving satisfactory results, because there is no reason why entire satisfaction should not be derived from the use of gas-fires, and they will gladly assist consumers to obtain it. But to condemn gas-fires *in toto* because some are poorly designed and badly fitted, when well-designed fires can be obtained and can be properly fixed, is as illogical as it would be to condemn motor-cars entirely because there are badly designed, crudely constructed, and unskilfully driven cars still on the road.

Mr. Walter boldly states that "it has yet to be demonstrated that a small room can hygienically be heated by a gas-fire." I could refer him to hundreds of medical men in London who would contradict him from their own practical experience; but it will perhaps suffice to quote for his information from a report on gas-fires issued by the "Lancet" as long ago as 1893, and since confirmed by the investigations of other independent authorities:

> Most minute tests failed to find any deleterious products in the air of the room, in spite of the fact that no special precautions were taken to ensure ventilation. . . . Summing up the evidence gained from the entire results of the investigation, we are induced to express the opinion that gas can be used for warming purposes efficiently without prejudice to health, and without the formation of fog-forming constituents or air-contaminating products.

As to the relative cost of gas-fires and electric radiators, it may be pointed out that 1000 watts of electrical energy turned into heat would give 3410 B.Th.U.; while 1d. worth of gas (at 2s. 10d. per 1000 cubic feet) turned into heat is equivalent to 16,200 B.Th.U. Thus 80 per cent. of the heat generated by the combustion of gas could be "wasted" in assisting the ventilation of a room, and still the heating would be as economical as by electricity at 1d. per unit. The percentage of heat from a gas-fire that is lost up the chimney is, of course, far less than the figure named. I might add that galvanometer tests of the radiant heat from a gas-fire and an electric radiator fully confirm the theoretical economy of the former means of heating.

THE GAS-WORKS EXPLOSION AT BIRMINGHAM.

Opening of the Inquest.

The inquest was opened last Wednesday morning upon the bodies of Alfred J. Ward, aged 45, and George Willis, aged 53, who were killed by an explosion at the Windsor Street Gas-Works of the Birmingham Corporation on the previous Sunday afternoon, under circumstances which were recorded in last week's JOURNAL (p. 580). Mr. Prideaux and Mr. G. Hampton Barber (the Secretary of the Gas Department) watched the case on behalf of the Corporation; and Mr. R. E. Graves (Factory Inspector) was also present.

The City Coroner (Mr. I. Bradley) announced that he was afraid it would not be practicable to close the inquiry that morning. One of the men who was injured was not well enough to be called as a witness; and though he might not be able to tell them a great deal, it would not be proper to close the inquiry without hearing him. He should take formal evidence of identity; and then Mr. Foster, the Works Engineer, would give them some idea of what happened. He should also take formal evidence of the finding of the bodies. Mr. Prideaux said that Sir Hallewell Rogers, the Chairman of the Gas Committee, regretted that he personally was unable to be present. Sir Hallewell had requested him to say, on behalf of himself (Sir Hallewell) and the Committee, how much they regretted the accident in which two valued servants lost their lives. On behalf of the Chairman and the Committee, he was requested to extend sincere sympathy to the relatives and the friends of the deceased. Of course, every possible assistance would be given to the Coroner and the Jury.

Evidence of identification having been given, Dr. J. F. Craig, Police Surgeon, said Willis's body was burned quite black, and was all charred, with the exception of part of the abdomen and left hip. In some cases the muscles were burned right through, as well as part of the bones. As regarded Ward, the evidence was the same, with the exception that the burning was more extensive. He was burned all over the body. Death in both cases was due to shock, the result of the injuries, and must have been instantaneous.

Mr. John Foster, the Works Engineer at Windsor Street, who was the next witness, said that Charles Egginton (the injured man) was a pipe-layer, and the deceased were labourers working under him. They were engaged in the exhauster-house removing a 6-foot length of 24-inch pipe, which was in the way of some proposed new foundations. A similar piece of work had been done under the same conditions without difficulty on Feb. 9. Witness arrived at the works at eleven o'clock on Sunday, and went to the exhauster-house about twenty minutes later. The deceased men were at work in the hole; and Egginton was cutting the pipe with a hammer and chisel. He first cut a hole about 2 inches long on top of the pipe near the socket, and then drove a wedge in. The other two men were standing by at the time. The making of gas had ceased some time before; and all the necessary valves had been properly screwed down, so that no current of gas was passing through the pipe. The only gas in the pipe was such as lay dormant; and there was no pressure whatever. As proof that there was not much gas in the pipe, witness stated that he stood over it for three-quarters of an hour without inconvenience; whereas if there had been much gas escaping he would have been overcome by it. At 12.30 the men had cut the main right through. They then removed the pipe from the socket, and proceeded to cut out the spigot-piece by means of a hand hammer and chisel. About 3 o'clock he was called to the works again, and found that an explosion had occurred near the Livesey washers, which were almost 100 yards from the exhauster-house. The main at which the men had been working had fired, and the flame had burnt all the woodwork. An explosion could not have occurred unless the gas lying dormant in the pipe had become ignited.

The Coroner remarked that he would reserve the question of the cause of the ignition until he had heard what Egginton and others had to say. It was well not to go into theories till they had heard all the facts.

An engineer in the Aston Fire Brigade, named John Duggins, said that when the chemical engine arrived at the works, a fireman put on a smoke helmet and went into the hole, but could not find the bodies. At that time the hole was full of flame, which reached to the roof; and the fumes made it very dangerous to be in the vicinity. The building was well alight, and parts of the roof were falling. Two firemen went down again, and found the deceased. By this time the flames had been extinguished, and witness was able to see the position in which the men lay. Willis was lying on his face with the pipe partly over his body; and Ward was close to the socket, lying on his back with his head doubled under him. The pipe was already attached to pulley blocks; but it had not been raised sufficiently to clear the body of Willis.

The inquiry was then adjourned until to-morrow (the 11th inst.).

THE LONDON SMOKE PROBLEM.

Proposals for Reform.

The unsatisfactory state of the existing law with reference to the smoke nuisance has lately been borne in upon the Public Control Committee of the London County Council by the failure of a costly prosecution, instituted by the Chelsea Borough Council, of the Underground Electric Railway Company, for allowing the emission of black smoke from their generating station at Chelsea. The Committee have been giving serious consideration to the possibilities of reducing the amount of smoke constantly suspended in the air of the Metropolis; and Mr. James Ollis, the chief officer engaged in the prevention of smoke, has presented to the Committee a report on the subject.

Mr. Ollis cites New York, where nothing but hard or anthracite coal is burnt, though supplies of soft and cheaper coal are available, as a place where "the atmosphere is so clear that in winter as well as in summer the lightest coloured fabrics of wearing apparel and clean white linen are worn by all classes of the community; and on ordinary days the separate buildings and at night the separate lights of New York are visible with the naked eye from Montclair, New Jersey, twenty miles distant." To have such a condition of things as this in London would mean the abolition of the domestic fireplace, which is accused of contributing a good half to the volume of smoke, and the installation of a system of hot-air pipes. This, however, is not contemplated by Mr. Ollis. He suggests, among other things, that the populace should be educated in the "principles of scientific heating;" and he apparently contemplates the possibility of a future campaign against the household hearth, for he says: "Smoke considerations have been until recent years almost disregarded in the manufacture of grates for domestic purposes. In any attempt to deal with so-called domestic smoke, the public must be first shown the advantage of other warming methods; but some compulsion might be exercised in the business quarters of London. Large blocks of office premises might easily be warmed from a central heat-distributing chamber. The labour involved in lighting and tending the present number of fires, and the consequent cleaning, is absurdly uneconomical; and there is much reason for concludiug that improvements in methods of heating will follow upon any encouragement and stimulus from large local authorities. Methods of central heating applied to a block of model dwellings would mitigate the miserable conditions under which their occupants live in inclement weather. The meagre fires burning in the grates of several tenements can have but little effect on temperature; whereas the fuel burning in mass in one central warming chamber combined with a hot-water supply system would give opportunities for comfort and cleanliness now non-existent. Cooking by gas-stoves in place of the ordinary kitchener has made much headway in London; but with a cheaper gas it would no doubt become the rule. The ordinary kitchener might in time disappear, and with it an important factor in smoke production."

Referring to the effects of smoke on the population of London and on Metropolitan life, Mr. Ollis says: "The exclusion of sunlight, the production of dirt, the darkening and intensifying of fogs, and indirectly the erosion of stone surfaces, all arise from the soot in the atmosphere. Exclude this minute particle from the London atmosphere, and the conditions of London life would be transformed. The extent of the smoke evil is probably only realized in periods of fog when the interruption of trade and communication and the resort to artificial light must be the equivalent of heavy money losses. Yet without the smoke hardly a single London fog would attain a density that might be classed as thick. Much attention has been directed to the destructive agency of smoke. . . . All our prominent monuments and buildings suffer seriously from surface erosion. It will be easily realized that the extra cost of cleansing, repair, and other expenses rendered necessary by the fog and the fouling and destroying action of smoke must in the mass amount to a very large sum. The Hon. Rollo Russell estimates that smoke costs London over £5,000,000 annually, nearly all of which would be saved if coal smoke could be excluded from the atmosphere. But the loss of most moment is the injury to the vitality and standard of life among the mass of the popu-

lation from the exclusion of sunlight and the fall of soot dirt. . . . In the winter, skies, naturally gloomy, are so loaded with smoke particles that the extreme limit of visibility from elevated positions in central London is set at 1½ miles. The fall of soot is as serious as the loss of sunlight. It has been estimated to amount to 40 cwt. per acre per annum."

Among the suggestions made to the Committee by Mr. Ollis are the following: "That dense smoke discharged from any building or locomotive (other than a private dwelling-house) within 12 miles of Charing Cross shall be a nuisance for which a fine not exceeding £10 may be imposed, with cumulative penalties for subsequent offences, at the discretion of the Magistrate. That the London County Council shall have power by bye-law, subject to the approval of the Home Office or Local Government Board, to bring under the terms of this provision other instances of avoidable smoke nuisance, and to prohibit the adoption, in new or reconstructed factories, premises, or buildings, of any furnace, grate, or other fuel-consuming apparatus of a type which shall have been proved to the satisfaction of the Council to produce an unnecessary amount of smoke. That exemption from liability to penalties, implied or expressed, in favour of Crown property or premises of electric power corporations be repealed. That the London County Council shall have joint authority with the several administering bodies to enforce the law. That the Council shall have power to expend money for the purpose of promoting a knowledge of the principles of combustion of fuel, furnace and grate construction and stoking, and for encouraging the study of the scientific heating of houses or the use of smokeless fuels with a view to the reduction of nuisance from the open fire-grate."

Sale of the Llanelly Electric Lighting Order.—At the last meeting of the Llanelly Urban District Council, the Press were informed by the Chairman (Mr. W. B. Jones) that the Council had decided to sell their Electric Lighting Order. They were unanimous on the question, as that was their only chance of getting electric light for the town, and possibly traction as well.

The Water Supply of Nelson.—The Nelson Town Council have at present under consideration a proposal to construct a reservoir with a capacity of 160 million gallons, which will more than double the present storage. The estimated cost of the reservoir is £50,000; and it is expected to occupy five years in construction. Owing to the great increase of population, the town has now only 96 days' supply; and the Water Engineer recommended that 160 days' supply was necessary to be within safe limits, and to avoid such serious consequences as occurred owing to drought six years ago.

Gas and Electricity Profits at Lincoln.—At a meeting of the Lincoln City Council last Tuesday, the Gas Committee recommended that a sum of £3500 should be appropriated in aid of the general district rate. The Committee were congratulated upon the extremely satisfactory result of the year's working. The Electricity Committee also recommended the handing over out of their funds of £1000 in aid of the general district rate; but it was stated by the Chairman (Mr. C. Pratt) that, though the Committee had felt called upon to give something to the rates this year, he did not think they would be justified in granting any similar sum in the future, as larger and improved machinery would be required at the works.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

The proposal for the transfer of the undertaking of the Selkirk Gas Company came to an unexpected end last night, when the result of the poll of the ratepayers was declared. The figures were: Against, 397; for, 346—giving a majority of 51 against. So there will be no transfer. The number of electors who polled was 743, and as the municipal constituency numbers 1444, it will be seen that little more than half of the electors voted.

The annual dinner of the Edinburgh and Leith Gas Commissioners, held on Tuesday evening, was, as all such occasions are, a very pleasant gathering. There was the customary interchange of courtesies with the Corporation of Glasgow, which are getting more pronounced year by year; and public life is the sweeter in consequence. The speakers of the evening did not disclose anything which was new, and in only one particular is there occasion given for comment here. That was the vigorous protest by Bailie Maxton against the attempt which is being made in the Edinburgh Town Council to convert their representatives upon the Gas Commission into delegates. The step complained of arises in connection with the illuminating power of the gas. Gentlemen in the Town Council who have not the benefit of technical advice have formed the opinion that the gas should be of a certain illuminating power; and they wish to give instructions that it shall be so. It is in the expectation that their hand will be strengthened in this direction that they have secured the erection of photometric plant in the City Chambers. But gentlemen taking up the position of controlling the Gas Commission from the Council Chamber forget that when they return a member to the Commission he is not allowed to do any work till he has taken a solemn obligation to promote the interests of the Commission.

My remarks last week regarding the liquidation of Messrs. Bruce Peebles and Co., Limited, of Edinburgh, received confirmation when the questions raised regarding the appointment of Liquidators came before the First Division of the Court of Session on Thursday. A report of what was spoken in Court does not convey the full significance of the proceedings. Had the Court, in the exercise of their discretion, appointed a Liquidator or Liquidators who were not well versed in the business, and resultantly liable to make mistakes, there might have been a series of litigations, which would have ruined the business, to the great loss of the creditors and shareholders. The interest of the situation was in the getting of the liquidation started upon right lines. The Court realized this, and appointed the two gentlemen nominated by the shareholders, and approved by the creditors, or by overwhelming majorities of both bodies. The decision of the Court ensures, so far as has yet been seen, that the business will go on uninterruptedly; and there may not, after all, be much loss to those who have invested in the undertaking.

A Special Committee of the Dundee Town Council have been considering the subject of the purchasing of coal for the Corporation Electricity Department. They have reached the conclusion that when they purchase coal from local contractors they pay fully 60 per cent. more than when they take it from coal owners direct. The Committee there-

GAS COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 611.

Issue.	Share	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
500,000	10	Oct 11	10½	Alliance & Dublin 10 p.c.	20–21	..	5 0 0
268,324	10	.	7½	Do. 7 p.c.	14–15	..	5 0 0
300,000	Stk.	Jan. 16	4	Do. 4 p.c. Deb.	100–103	+2½	3 17 8
200,000	5	Oct. 30	7	Bombay, Ltd.	6½–6¾	..	5 3 8
40,000	5	,,	7	Do. New, £4 paid	4½–5	..	5 12 0
50,000	10	Feb. 27	14	Bourne-mouth Gas and Water — 10 p.c.	27–28*	..	5 0 0
51,810	10	,,	7	Do. B 7 p.c.	16½–16¾*	..	4 3 7
53,200	10	,,	6	Do. Pref. 6 p.c.	14–15*	..	4 0 0
380,000	Stk.	,,	12½	Brentford Consolidated	242–247*	..	5 1 3
300,000	,,	,,	9½	Do. New	180–185*	..	5 2 8
50,000	,,	,,	5	Do. 5 p.c. Pref.	118–123*	..	4 1 4
906,250	,,	Dec 13	4	Do. 4 p.c. Deb.	100–105	..	3 16 2
220,000	Stk.	Sept. 27	11½	Brighton & Hove Orig.	203–210	..	5 7 1
246,320	,,	,,	8½	Do. A. Ord. Stk.	155–160	..	5 3 2
460,000	20	,,	10	British	43–44	..	4 10 11
104,000	Stk.	Feb. 13	6	Bromley, Ord. 5 p.c.	116–119	..	5 0 10
165,700	,,	,,	4½	Do. do. 3½ p.c.	86–89	..	5 1 2
500,000	10	Oct. 11	7	Buenos Ayres (New) Ltd.	11¼–12	..	5 16 8
250,000	Stk.	Dec. 13	4	Do. 4 p.c. Deb.	93–95	..	4 4 3
150,000	20	July 12	7½	Cagliari, Ltd.	26–27	..	5 7 5
100,000	10	—	—	Cape Town & Dis., Ltd.	4–6	..	—
100,000	10	Apl. 26	4½	Do. 4½ p.c Pref.	7–9	..	5 0 0
50,000	50	Nov. 2	6	Do. 6 p.c. 1st Mort.	48–50	..	6 0 0
100,000	Stk.	Dec. 30	4½	Do. 4½ p.c. Deb. Stk.	92–94	..	4 15 9
157,150	Stk.	Feb. 27	5	Chester 5 p.c. Ord.	105½–107½*	..	4 13 0
1,493,280	Stk.	,, 29	5⅛	Commercial 4 p.c Stk.	105–110	..	4 14 6
560,000	,,	,,	3	Do. 3½ p.c. do.	101–106	..	4 14 4
475,000	,,	Dec. 13	3	Do. 3 p.c. Deb. Stk.	82–84	..	3 11 5
800,000	Stk.	,,	6½	Continental Union, Ltd.	115–120	..	5 8 4
200,000	,,	,,	7	Do. 7 p.c. Pref.	140–145	..	4 16 7
460,170	Stk.	—	5½	Derby Con. Stk.	122–123	..	4 9 5
55,000	,,	—	4	Do. Deb. Stk.	103–105	..	3 16 2
148,995	,,	—	—	East Hull 5 p.c. Ord.	100–103	..	—
486,060	10	Jan. 30	12	European, Ltd.	23–24	..	5 0 0
354,060	10	,,	12	Do. £7 10s. paid	16½–17½	..	5 2 10
15,181,590	Stk.	Feb. 13	4⅛	Gas-light and Coke — 4 p.c. Ord.	95–96	–1	4 11 7
2,600,000	,,	,,	3½	3½ p.c. max.	86–88	..	3 19 7
3,799,735	,,	,,	4	4 p.c. Con. Pref.	105–108	..	3 14 1
4,193,975	,,	Dec. 13	3	3 p.c. Con. Deb.	82–84	..	3 11 5
258,740	Stk.	Sept. 13	5	Hastings & St. L. 3½ p.c.	93–98	..	5 2 0
82,500	,,	,,	6½	Do. do. 5 p.c.	114–117	..	5 11 1
70,000	10	Oct. 11	11	Hongkong & China, Ltd.	19–20	..	5 10 0
4,940,000	Stk.	Nov. 14	8	Imperial Continental	179–182	..	4 7 11
473,600	Stk.	Feb. 13	3½	Do. 3½ p.c. Deb. Red.	92–94	..	3 14 6
195,242	Stk.	Aug. 29	6	Lea Bridge Ord. 5 p.c.	115–120	..	5 0 0
£			p.c.				£ s. d.
551,000	Stk.	Feb. 27	10	Liverpool United A	218–220*	..	4 10 11
718,100	,,	,,	7	Do. B	161½–163½*	+½	4 5 8
306,083	,,	Dec. 30	4	Do. Deb. Stk.	106–108	..	3 14 1
152,736	Stk.	Feb. 13	7⅞	Maidstone 5 p.c.	133–141	..	5 8 2
75,000	5	Nov. 28	5	Malta & Medn., Ltd.	4¼–4¾	..	5 5 3
560,000	100	Oct. 1	5	Met. of 5 p.c. Deb.	101–103	..	4 17 1
250,000	100	,,	4½	Melbourne 4½ p.c. Deb.	10 –103	..	4 7 5
541,920	20	Nov. 14	3½	Monte Video, Ltd.	10½–11¾	..	6 1 9
1,775,892	Stk.	Feb. 27	4⅝	Newc'tle & G'tesh'd Con.	106½–107½	+½	4 6 1
418,463	Stk.	Dec. 30	3½	Do. 3½ p.c. Deb.	87–88	+½	3 19 7
15,000	10	Feb. 27	10	North Middlesex 10 p.c.	19–20*	..	5 0 0
55,940	10	,,	7	Do. 7 p.c.	12½–13½*	..	5 3 8
300,000	Stk.	Nov. 28	8	Oriental, Ltd.	140–143	..	5 11 11
60,000	5	Sept. 13	7	Ottoman, Ltd.	6–6½	..	5 7 8
398,490	5	Oct. 30	7	Primitiva Ord.	6⅞–7¼	..	4 16 7
796,980	5	Jan. 30	5	Do. 5 p.c. Pref.	4⅝–5⅛	..	4 17 7
488,900	100	Dec. 2	4	Do. 4 p.c. Deb.	93–95	..	4 4 3
1,000,000	10	Oct. 11	8	River Plate Ord.	13½–14	..	5 14 4
312,650	Stk.	Dec. 30	4	Do. 4 p.c. Deb.	93–95	..	4 4 3
250,000	10	Sept. 27	8	San Paulo, Ltd.	13–13⅜	..	5 18 6
125,000	50	Jan. 2	5	Do. 5 p.c. Deb.	49–51	..	4 18 0
135,000	Stk.	Sept. 13	10	Sheffield A	245–247	..	4 1 0
209,984	,,	,,	10	Do. B	245–247	..	4 1 0
323,500	,,	,,	10	Do. C	245–247	..	4 1 0
70,000	10	Nov. 14	10	South African	14½–15½	..	6 9 0
6,429,895	Stk.	Feb. 13	5⅛†	South Met., 4 p.c. Ord.	121–123	..	4 6 8
1,895,445	,,	Jan. 16	3	Do. 3 p.c. Deb.	83–85	..	3 10 7
209,820	Stk	Sept. 13	8	South Shields Con. Stk.	154–156	..	5 2 7
605,000	Stk.	Feb. 27	5⅛†	S'th Suburb'n Ord. 5 p.c.	116–119*	..	4 9 7
60,000	,,	,,	5	Do. 5 p.c. Pref.	118–121*	..	4 2 8
117,058	,,	Jan. 16	5	Do. 5 p.c. Deb. Stk.	120–125	..	4 0 0
502,310	Stk.	Nov. 14	5	Southampton Ord.	107–112	..	4 9 3
120,000	Stk.	Feb. 27	6⅔	Tottenham A 5 p.c.	19–122*	..	5 10 8
398,940	,,	,,	5⅓	and B 3½ p.c.	100–103*	..	5 1 11
149,470	,,	Dec. 13	4	Edmonton 4 p.c. Deb.	59–102	+1	3 18 5
182,380	10	Dec. 30	8	Tuscan, Ltd.	10⅜–10¾	..	7 8 10
149,900	10	Jan. 2	5	Do. 5 p.c. Deb. Red.	98–100	..	5 0 0
193,742	Stk.	Feb. 27	5	Tynemouth 5 p.c. max.	105–107*	..	4 13 6
255,636	Stk.	Feb. 13	6½	Wandsworth and Putney — B 3½ p.c.	128–133	..	4 17 9
80,075	,,	Dec. 30	3	3 p.c. Deb. Stk.	73–78	..	3 16 11
845,872	,,	Feb. 27	5⅛	West Ham 5 p.c. Ord.	101–104*	..	4 18 6
185,000	,,	,,	5	Do. 5 p.c. Pref.	118–120*	+1	4 3 4
228,300	,,	Dec. 30	4	Do. 4 p.c. Deb. Stk.	102–107	..	3 14 9

Prices marked * are "Ex div." † Next dividend will be at this rate.

fore recommended that the coal buying for the department be done by tender, giving controlling middlemen and colliery owners opportunity to offer as well as local contractors; and that the Special Committee, with the addition of the Convener of the Gas Committee, be continued for the carrying of the recommendation into execution, and also with a view to considering and determining as to the desirability of having a combination of all the coal-using departments, and contracting for their yearly wants, if possible, at one time and under similar conditions, with power to consider as to chemical analysis and the best method of employing it. The Committee also recommend that, in the meantime, the Town Clerk intimate to the contractors that unless the quality of the coal supplied by them is equal to the sample submitted, the Council will buy supplies in the open market against them.

On the afternoon of Saturday last, members of the Committees of the St. Andrews and Greyfriars wards paid a visit to the gas-works belonging to the Corporation of Aberdeen. The company numbered between 60 and 70. They were received at the gate of the works by Councillor Stewart, who is the Convener of the Gas Committee, and Mr. C. E. Smith, the Assistant-Manager; Mr. S. Milne, the Manager, being from home. Four parties were made up; and these spent two hours in going over the works. At the close of the inspection, the visitors assembled in the testing-room, where both Mr. Stewart and Mr. Smith expressed the pleasure they had had in showing the works, and the hope that the company had received instruction. These gentlemen were accorded a hearty vote of thanks for their services.

The Gas Committee of the Hamilton Town Council reported to the Council last week that they had met the Engineer and the General Manager of the Caledonian Railway Company with reference to the construction of a railway siding into the gas-works. The Engineer had informed them that their estimate for the work, including the erection of a weighbridge, was £2000, but that the Company charged only the actual cost, and he anticipated it would not exceed £1900. The General Manager had informed them that the rates for haulage would be the same as those which were charged for similar work at the Central Station at Hamilton. The Committee agreed to the terms. An attempt was made to discuss the subject; but it was pointed out that the Council had remitted to the Committee with powers, and that the report was only made to the Council for information and as a matter of courtesy. The Provost ruled discussion out of order, whereupon two members of the Council protested. The construction of this much-discussed siding will, however, now be proceeded with.

The shareholders of the Larkhall Gas Company, Limited, held their twelfth annual meeting on Friday evening of last week. The Directors reported an available balance of £2225 for appropriation. They recommended payment of a dividend of 10 per cent.; the placing of £400 to the reserve fund; and the carrying forward of £1030. This was agreed to.

At a meeting of the Sanquhar Town Council on Monday, the Clerk read a communication from Mr. T. M'Lintock, the Burgh Auditor, in which it was stated that the price of the gas-works should consist of the price paid by Messrs. Macrae and Forsyth—£850—and all the liabilities incurred by that firm from the date of the purchase on Jan. 4, 1907, until the Council took over the works on Jan. 4, 1908. It was agreed to mortgage the rates in security of the purchase price. At a meeting of the Council on Thursday, Provost Waugh and the Town Clerk—Mr. W. Forsyth—reported regarding an accident to the gasholder that happened recently, when a chain snapped and the holder tilted, allowing a large quantity of gas to escape, whereby the town was practically thrown into darkness. It was found that the chain which gave way was very much corroded, as were also all the others on the holder; but the cause of this one breaking could not be discovered. The report was received.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *March 7.*

Sulphate of Ammonia.

There has again been good demand, everything offering being readily absorbed, and at some points slightly advanced prices have been paid. But direct demand has not been large; the bulk of the output being taken for the purpose of covering existing contracts. There has been inquiry from Spain; but the views of buyers are below the level of spot prices. The closing quotations are £11 18s. 9d. per ton f.o.b. Hull, £12 per ton f.o.b. Liverpool, and £12 2s. 6d. per ton f.o.b. Leith. There has also been inquiry for delivery ahead; but buyers are not very keen, and not much important business has transpired. The quotations for delivery up to the end of the year are £12 to £12 2s. 6d. per ton f.o.b., according to port.

Nitrate of Soda.

The market is quiet but steady, and spot prices are 11s. 1½d. and 11s. 4½d. per cwt., less 2½ per cent. discount, for 95 per cent. and refined qualities respectively. Further ahead, there is very little interest; the very heavy shipments in January and February discouraging buying.

LONDON, *March 9.*

Tar Products.

The markets have been steady throughout the past week, with little alteration in the prices; but business is still difficult to negotiate. At most ports the fall in pitch appears to be arrested, for the time being at any rate; probably owing to the fact that manufacturers have disposed of the bulk of what they will produce between now and the end of June. As regards forward delivery, business is reported at very low figures on the Continent for September-June delivery next season; but the English manufacturers are at present out of the market, as they prefer waiting the course of events before selling further. Creosote is quiet. In London, business has been done for prompt at prices varying from 2⅛d. to 2⅜d.; but for forward, manufacturers ask 2¾d. In the Midlands, manufacturers are asking 2¾d. for delivery to June. In the Yorkshire and Lancashire districts, several transactions have

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taken place at 2¼d. makers' works; and in one or two cases sales are reported at less than this figure. Benzol 90 per cent. is unchanged. There are sellers in the North at 8d. per gallon, and in London at 8⅜d. There is very little business doing in 50-90 per cent. benzol and toluol. In solvent naphtha, there are sellers of country makes at 10¼d. delivered in London; and though London makers only ask 10¼d., they cannot obtain this figure. Carbolic 60's remain in about the same position. Business is reported to have been done at about 1s. 7d. on the east coast for prompt delivery, though the Continental consumers refuse to pay more than 1s. 6⅛d. Creosote salts are rather easier; there having been a considerable quantity placed upon the market during the past few weeks.

The average values during the week were: Tar, 12s. 6d. to 16s. 6d. *ex* works. Pitch, London, 20s. 6d. to 21s.; east coast, 19s. 6d. to 20s.; west coast, 19s. to 20s. f.a.s. Benzol, 90 per cent., casks included, London 8⅜d, North 8d.; 50-90 per cent., casks included, London 8⅛d. to 8⅜d., North 8d. Toluol, casks included, London 9⅛d., North 8⅛d. Crude naphtha, in bulk, London 3⅜d. to 4d., North 3⅛d. to 3⅜d.; solvent naphtha, casks included, London 10¼d., North 9d. to 9¼d.; heavy naphtha, casks included, London 11d. to 11¼d., North 10d. to 10¼d. Creosote, in bulk, London 2⅛d. to 2⅜d.; North 2⅛d. to 2¼d. Heavy oils, in bulk, 2⅞d. Carbolic acid, 60 per cent., casks included, east coast 1s. 6⅜d., west coast 1s. 6⅛d. Naphthalene, £4 to £8 10s.; salts, 37s. 6d. to 40s., packages included and f.o.b. Anthracene, "A" quality, 1⅛d. to 1¾d. per unit, packages included and delivered.

Sulphate of Ammonia.

This article is steady. The principal Gas Companies still quote from £12 3s. 9d. to £12 5s. for forward delivery, and are very firm in their ideas. In London, business has been done at £12 per ton upon f.a.s. terms; while the outside makes have been sold at £11 17s. 6d. to £11 18s. 9d. upon Beckton terms. In Hull, business has been done at £12 for one of the best makes; and for prompt delivery some of the makers are asking £12 2s. 6d. In Liverpool, business has been done at £12 to £12 1s. 3d. In Leith, £12 1s. 3d. to £12 2s. 6d. is asked; and it is reported that the latter figure has been paid.

Winding Up of Block Light, Limited.—At an extraordinary general meeting of Block Light, Limited, a resolution was passed to the effect that the Company cannot, by reason of their liabilities, continue business, and that the concern be wound up voluntarily. Mr. John H. Savage was appointed Liquidator.

Gas-Fired Steam-Boilers.—At the monthly meeting of the Manchester Section of the Society of Chemical Industry last Friday, Mr. J. H. Lester described experiments he had made to secure the greatest heat from gas in its application to steam-boilers. The results obtained led him to take out a patent for his scheme, which consists in burning gas in confined areas, for which purpose he used copper tubes 7 inches long. The object is to get these filled with flame.

COAL TRADE REPORTS.

Lancashire Coal Trade.

Lancashire coal owners are successfully maintaining the average prices of coal fixed in September last—viz., best house coal 15s. to 16s. 6d., secondary 14s. to 15s., common 12s. to 13s. 6d. per ton at the pits; burgy 10s. 6d. to 11s. 4d., best slack 9s. 6d. to 10s. 4d., medium 8s. 6d. to 9s.; lower qualities 7s. 9d. to 8s. 4d.; coal for shipping 13s. to 14s. 6d. f.o.b. at the tips of the Ship Canal and at Liverpool. Furnace coke varies from 18s. to 24s. per ton. The state of trade, increased exports, and the inclement weather of the past few months, have served to keep up the demand for all qualities of coal. Gas coal and cannel have been almost at a premium. The removal of the coal tax has led to enlarged exports; and the proposed eight hours in mines, added to the late increases in wages, seems to prohibit any reductions in coal prices in this country at present.

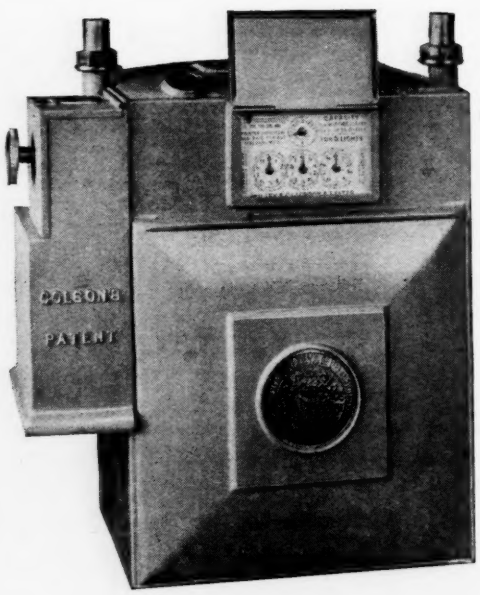
Northern Coal Trade.

The demand for coals has shown an increase, in the last few days, in the northern coal trade, and prices for some kinds of fuel are higher. Best Northumbrian steams are firmer. The exports have been heavier; and the current quotation is from 12s. 3d. per ton f.o.b. Second-class steams are 11s. to 11s. 3d., and steam smalls are also firmer at about 6s. to 6s. 6d. Work at the collieries is steady; and the output is generally well taken up for this season of the year. In the gas coal trade, the inquiry is fairly full; and the prices show that for a time the easing-off is checked. Durham gas coals for prompt shipment vary from about 10s. 3d. to 11s. per ton f.o.b., with 12s. per ton quoted for special Wear qualities. There are many small contracts for shipment over the season now being arranged, and there has been a rumour of large southern contracts being put into the market; but the latter is at least premature. Contracts that have been settled include one for about 10,000 tons; and the price of this is believed to be equal to 12s. 4d. per ton f.o.b. for very best kinds. Other lots of second-class gas coal have been sold at equal to 10s. 3d. per ton f.o.b.; so that it will be seen that the prices vary. Coke is steady; but gas coke seems easier. The quotation is from about 16s. per ton f.o.b.

Scotch Coal Trade.

The market continues to go back. There is not sufficient demand to take up the supply, and consequently idle time is beginning to be experienced in the pits. Prices are receding still. The quotations are: Ell 10s. 6d. to 11s. 6d. per ton, f.o.b. Glasgow, splint 12s. to 12s. 3d., and steam 10s. 9d. to 11s. The shipments for the week amounted to 190,226 tons—a decrease of 59,173 tons upon the preceding week, and of 101,469 tons upon the corresponding week of last year. For the year to date, the total shipments have decreased 291,898 tons.

The Directors of the Richmond Gas Stove and Meter Company, Limited, recommend a final dividend of 10 per cent. per annum, with a bonus of 2½ per cent., making 12½ per cent. for the year.



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Fatality at the Bromley-by-Bow Gas-Works.

On Monday last week, Mr. G. E. Hilleary, the Coroner for West Ham, held an inquiry at the Public Hall, Canning Town, relative to the death of Charles Myers (49), a lighterman in the employ of the Gaslight and Coke Company, whose body was found in the tidal basin at the Bromley Gas-Works on the previous Saturday morning. Mr. Luxton (Messrs. Monier-Williams and Robinson) watched the proceedings on behalf of the Company. Evidence was given by a lighterman named Hake to the effect that when he went to work on the morning in question he found a note addressed to deceased, ordering him to put the barge *Lily* alongside one under the lift, so that work might be started. Witness found the barge named lying loose; and on inquiring after Myers at his lodgings, he found he had not been home all night. The tidal basin was then dragged, and the body found. There had been a frost in the night, and the barges were slippery. Henry Han, the coal foreman, said he left the note to which reference had been made. What the deceased was asked to do was work he had done many hundreds of times, and a lighterman would not consider it dangerous. It was part of his duty to shift the barges; and he was constantly doing it. There was a fairly good light at night all along one side of the dock. Another witness deposed to finding the body in 4 feet of water under the head of the *Lily*, about 80 yards from the dock gate. Dr. F. L. M'Dermott stated that he was called to the works on the morning of the 29th ult., and saw the body, which he should consider had been some hours in the water. There were no marks of violence; and he had no doubt the cause of death was suffocation, due to drowning. The Jury, after a brief consultation, returned a verdict that the deceased met his death by suffocation due to drowning through falling off a barge; and that the accident occurred while he was in the execution of his duty.

Serious Charge Against a Gas Official.

At Maidstone Police Court, last Tuesday, Mr. Herbert K. Kindler, for some years Assistant-Manager to the Maidstone Gas Company, was charged with obtaining from Mr. William Day, jun., a banker's cheque for £300 by means of false pretences, and was remanded for a week without bail. Prisoner, who was well known in the town, caused a sensation a short time previously by his mysterious disappearance; and eventually he was arrested just outside the Edgware Road Post Office—as a result, it is said, of his having applied to some relatives for assistance, and directed the reply to be sent there. It seems that Mr. Kindler enjoyed the confidence and trust of a large number of people—many of them shrewd business men—in financial matters, and that he offered to carry out investments for them. Dealing with the matter, the "South Eastern Gazette" [Maidstone] says: "As to the manner in which Mr. Kindler carried on the business which seems to have ended so disastrously, no very precise information is obtainable. What is, however, perfectly clear is that many of the transactions were entered into with anticipations which were even more than hopeful, and certain it is nobody was more astonished at the ultimate turn of affairs than those whose credulous faith has been so rudely shaken. In the course of his inquiries, our representative interviewed several of those who have had dealings with Mr. Kindler; and from the information he received, it was apparent that gas shares bought one day at a certain figure became, in an incredibly short space of time, of substantially greater value. On the Saturday prior to his leaving the town, Mr. Kindler waited upon a friend with whom he had had earlier transactions, and explained in detail the golden opportunity of purchasing £500 worth of debenture stock; and, it appears, he also intimated that he was in a position to dispose of the stock immediately afterwards at a large profit. As he was desirous of purchasing immediately, it was necessary for him to obtain the balance of the amount; and in this respect he experienced no difficulty. The money was handed over, and a cheque drawn upon a local bank given in exchange; Mr. Kindler intimating that on the Monday the money would be in the bank and the cheque met in the usual way. On the Monday, Mr. Kindler explained that, owing to an expected letter not arriving, the money was not in readiness; but on the following day there was no doubt the cheque would be met. Next day, however, Mr. Kindler had left Maidstone; and, moreover, there was no money in the bank to meet the cheque he had left. Estimates of the sums to be accounted for vary considerably; but the general report is that the total is from £15,000 to £20,000."

Fires in the Metropolis.—According to the annual report of the Chief Officer of the London Fire Brigade (Captain J. de Courcy Hamilton), out of the 3320 fires which occurred in the Metropolis during the past year, 344 were directly or indirectly due to the use of gas. Escapes of gas caused 95 fires, and curtains or blinds coming into contact with lighted gas jets 102. There were 13 outbreaks of fire attributed to swinging gas-brackets, and 17 to gas-stoves. Seeking for an escape with a light caused 22 fires. Three fires—one of them serious—occurred at gas-works; and the causes of two are given as hot lights and spontaneous ignition, that of the third being unknown. There were 94 fires caused by electricity, and 88 of them were due to defective circuit.

Councillor and Gas Company at Normanton.—At the recent meeting of the Normanton Gas Company (*ante*, p. 508), the Chairman (Mr. E. Mitchell) remarked that a statement had been made at a meeting of the Normanton Urban District Council to the effect that the Company had been dealing unfairly with the Council with respect to their charges. This was absolutely devoid of foundation, so far as the Directors were aware. They expected criticism, and did not object to it when it was fair and respectful; but this was of such a character that they had decided to place the matter in their Solicitors' hands, to give the Councillor who made the charge an opportunity either of substantiating his statement or of withdrawing it. At a meeting of the Council last Tuesday, Mr. A. Smith said that he had, under a misapprehension, at a previous meeting made charges against the Company of unfair dealing with the Council. He had since learnt that these charges were entirely without foundation; and he desired to withdraw them unreservedly.

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Inclined Retorts for Market Harborough.—Mr. J. J. Gardiner, the Chairman of the Gas Committee, informed the Market Harborough Urban District Council at the last monthly meeting that the Committee had been deputed to go to Guildford to inspect the inclined retorts erected there. The Committee were unanimous in recommending that the system should be installed at the Market Harborough Gas-Works; and the Council adopted the recommendation.

Fire at the Bakewell Gas-Works.—There was an outbreak of fire—fortunately not of a very extensive character—in the governor-house at the Bakewell Gas-Works in the early hours of the morning of last Saturday week. The Manager (Mr. T. W. Tiplady) sustained some burns while engaged in endeavouring to overcome the flames; and eventually it was found necessary to cut off the supply of gas to the town at the holder. Before the gas was turned on again, all the consumers were asked to look to their taps.

Exmouth Water Supply.—A report was received by the Exmouth District Council last week from Messrs. Hill and Sons, in reference to the suggestion that an additional supply of water should be obtained from the River Otter. They pointed out that there are many towns and villages on the river, as well as a large area of cultivated land; and they expressed the opinion that the water would be unsuitable in quality for domestic purposes. They suggested that trial borings should be made on the first of the sites marked on a plan prepared by Professor Boyd Dawkins. In the annual report of the Medical Officer, which was read at the same meeting, reference was made to the water question. He strongly condemned the suggestion that water should be taken from the Otter, which he said was very seriously polluted by sewage, so that, however purified, the water would be always open to suspicion. It was decided to take the preliminary steps with a view to carrying out the trial boring suggested by the Engineers.

Chemical Company Promotions.—At the London Bankruptcy Court last Tuesday, Mr. Registrar Linklater held a sitting for the public examination of Mr. H. C. A. L. Woltereck, who applied to pass upon accounts showing total liabilities of £13,509, of which £8197 are unsecured, and assets valued at £56. In the course of his evidence, the debtor stated that he was a native of Hungary, but a naturalized Englishman, a qualified chemist, and a doctor of philosophy. In 1899, he came over from the United States to demonstrate his patented process for producing white lead by electrolysis. A Syndicate was registered as the Woltereck White Lead Company, and £30,000 was subscribed in Manchester; but, owing to disagreements, the Directors did not go to allotment, and the subscriptions were returned. Witness remained in this country to develop chemical processes. In 1902, the Eschweiler Woltereck Process Syndicate, Limited, was formed, with a capital of £12,000, for the production of ammonia by synthesis. Two years later, the Syndicate sold its assets to the Chemicals Proprietary Company, Limited, which had a nominal capital of £100,000. In 1907, the Company went into voluntary liquidation for the purpose of amalgamating with Chemicals Limited, under the name of the Sulphate of Ammonia Company, Limited, which was formed with a nominal capital of £125,000. Witness had in addition been interested in the formation of the Dibdin-Woltereck Process Development Company, Limited, and the Cyanide Manufacturing Company, Limited. The latter Company went into voluntary liquidation in 1905. His failure was due to his inability to find sufficient capital for producing sulphate of ammonia, and to bring the Chemical Proprietary Company to a paying stage. The examination was concluded.

The annual report of John Wright and Eagle Range, Limited, shows a net profit of £54,437; and it is proposed to pay a dividend of 2s. 6d. per share on the ordinary shares, to place £8000 to the reserve fund, and carry forward £8574.

Messrs. Clayton, Son, and Co., Limited, have secured, for Hastings and Napier (N.Z.) respectively, orders for two two-lift spiral-guided gasholders and steel tanks, each 70 feet diameter, with Clayton and Pickering's patent steel spiral guides.

It is reported that the Local Government Board have written declining the application of the Chinley Parish Council for powers to make and sell gas in their parish. The Council have asked for an estimate of the cost of an electric light installation.

The Gas Committee of the Devonport Corporation last week considered the tenders for the reconstruction of No. 2 retort-house and coal-stores, and the rearrangement of the coal elevating and conveying machinery, and decided to recommend the Council to accept that of Messrs. Willey and Co., of Exeter, for the sum of £8276.

The Hawick Gas Company have placed an order with Messrs. Robert Dempster and Sons, Limited, of Elland, for four 20 feet square purifiers, complete with foundations, superstructure, extension of roof, &c. The work will be carried out under the supervision of Mr. William A. Smith, the Company's Engineer and Manager.

The Directors of Stewarts and Lloyds, Limited, have decided, after setting aside £70,000 for depreciation, to recommend a dividend for the half year ended Dec. 31 at the rate of 11 per cent. per annum on the ordinary shares, the placing of £30,000 to the reserve fund, and the carrying forward of £72,000. A year ago the dividend was at the same rate, £25,000 was placed to reserve, and £61,000 carried forward.

When moving the adoption of the Lighting Committee's minutes in the Bangor City Council, Mr. Bayne called special attention to a big decrease in the manufacture of gas, due to bad business. For example, he said, Penrhyn Castle was empty; and this fact alone accounted for a decrease in the consumption of gas amounting to 622,000 cubic feet for the past eleven months. He hoped the day was not far distant when the Castle would be again occupied.

The writer of "Talk of the Town" in last Saturday's "Burton Daily Mail" referred in terms of praise to a large double-burner Welsbach self-intensifying lamp which has been put up temporarily by Mr. R. S. Ramsden, the Assistant Gas Manager to the Corporation, at the corner of the Police Station Buildings in the above-named town. The illuminating power is given as 1200 candles, and the gas consumption is approximately 40 cubic feet per hour; representing, with gas at 2s. 9d. per 1000 cubic feet, 1·33d. per hour.

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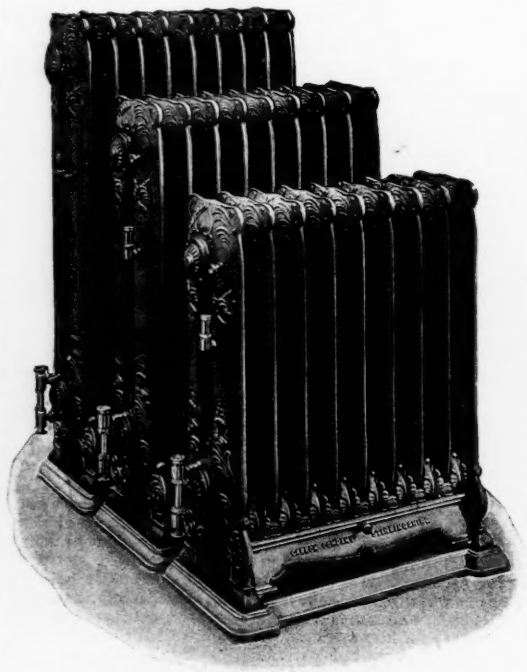

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No. 7.—"The Osram Lamp: Fiction and Fact."

This series of Leaflets will be useful, not only for distribution among Householders generally, but for circulation among Shareholders to fortify them with arguments in defence of the commodity in which they have invested capital. Copies of each Leaflet should also be kept in every Gas Undertaking's Show-Rooms.
Prices for Quantities on Application to WALTER KING, 11, BOLT COURT, FLEET STREET, E.C.

WANTED, FOR SALE, CONTRACT, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Situations Vacant.
SUPERINTENDENT (FITTINGS DEPARTMENT). Sheffield Gaslight Company. Applications by March 13.
COKE-OVEN MANAGER. No. 4916.
DRAUGHTSMAN. Gloucester Gas-Works. Application by March 26.

Situation Wanted.
DISTRICT OR SHOW-ROOM REPRESENTATIVE. No. 4917.

Plant (Second-Hand) Wanted.
SCRUBBER. Melksham Gas-Works.

Plant for Sale.
PURIFIERS. Long Eaton Gas-Works.

Patents (Exploiting).
PRODUCERS, &c. Haseltine, Lake, and Co., Southampton Buildings, W.C.
GAS-HEATED IRONS. Cruikshank and Fairweather, Chancery Lane, W.C.

Stocks and Shares.
BARNET GAS AND WATER COMPANY. March 17.
HORLEY GAS COMPANY. March 17.
ROMFORD GAS COMPANY. March 17.

Loans Wanted.
DURHAM GAS COMPANY.

TENDERS FOR

Brass and Meter Fittings.
DARLINGTON GAS DEPARTMENT. Tenders by March 19.

Coke.
WANDSWORTH AND PUTNEY GAS COMPANY. Tenders by March 19.

Compressing Plant.
CHORLEY GAS DEPARTMENT. Tenders by March 17.

Elevating and Conveying Plant and Coal-Store.
COLWYN BAY AND COLWYN GAS DEPARTMENT. Tenders by March 16.

General Stores (Lead, Lead Pipe, Drysaltery, Oils, Paints, Shovels, Forks, &c., &c.).
DARLINGTON GAS DEPARTMENT. Tenders by March 19.

Iron and Steel and Ironmongery.
DARLINGTON GAS DEPARTMENT. Tenders by March 19.

Meters.
LEEDS GAS DEPARTMENT. Tenders by March 23 (Samples by March 16).

Pipes, &c.
ISLE OF THANET GAS COMPANY. Tenders by March 18.
LEEDS GAS DEPARTMENT. Tenders by March 21.
RADCLIFFE AND PILKINGTON GAS COMPANY. Tenders by March 17.
ROTHERHAM GAS DEPARTMENT. Tenders by March 16.
SALFORD GAS DEPARTMENT. Tenders by March 26.
STOURBRIDGE GAS DEPARTMENT. Tenders by March 17.

Retort-Bench.
RHYL GAS DEPARTMENT. Tenders by March 25.

Retort-Fittings, Floors, &c.
SALFORD GAS DEPARTMENT. Tenders by March 26.

Tank for Gasholder.
WALLASEY URBAN DISTRICT COUNCIL. Tenders by March 19.

Tar and Liquor.
EAST HULL GAS COMPANY. Tenders by March 24.
HAWORTH URBAN DISTRICT COUNCIL. Tenders by March 23.
MOUNTAIN ASH URBAN DISTRICT COUNCIL. Tenders by March 24.

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No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or stoppages of, PERMANENT ADVERTISEMENTS should be received by the FIRST POST on SATURDAY.

Wanted, For Sale, and Tender Advertisements, Six Lines and under, 3s.; each additional Line, 6d.

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BRISTOL RECORDING GAUGES AND THERMOMETERS.

J. W. & C. J. PHILLIPS, 23, College Hill, London, E.C., and 7, Park Square, Leeds.

DISTRICT or Show-Room Representa- tive—Young Man, of Good Address, would like to submit his References and Experience to a Gas Company's Engineer, Manager, or Secretary, for consideration, with a view of obtaining POSITION as above. Well up in Modern Incandescent Lighting, Fittings, Stoves, and Gas Apparatus generally. Thorough Practical Experience in Fitting Department; also conversant in details of Electrical Appliances.
Address No. 4917, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

SHEFFIELD UNITED GASLIGHT COMPANY.
THE Directors of this Company require a SUPERINTENDENT for their Fittings Department. He must have a thorough knowledge of Gas-Fitting, be able to Control a large Staff of Workmen, and must understand Gas Engines, Fires, and Cooking Stoves, and the latest Forms of Incandescent Gas-Burners, both for High and Ordinary Pressures.
Commencing Salary, £300 per Annum.
Applications, marked "Superintendent," stating Age, whether Married or Single, and previous Experience, to be made by letter only, addressed to Mr. Hanbury Thomas, Managing-Director, and delivered by post not later than Friday, the 13th day of March, 1908.
Wm. Hamby,
Secretary.
Commercial Street,
Sheffield, Feb. 19, 1908.

COKE-OVEN Manager wanted for a Plant at a Colliery near Newcastle-on-Tyne. Should have Experience in Benzol Recovery and Tar Distilling.
Applications, stating Age, Wages Required, and Experience, with *copies* of Testimonials, to be sent to No. 4916, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

WANTED a Good Draughtsman, thoroughly acquainted with Gas-Works Plant, also Capable of Designing and Making any Drawings that may be required, and to assist generally in the Engineer's Office. One with a knowledge of Shorthand preferred.
Applications, stating Age, Experience, Salary required, and enclosing Testimonials, to be sent to the undersigned not later than March 26 inst.
W. S. Morland,
Engineer.
Gas-Works, Gloucester.

WANTED a Second-Hand Scrubber, equal to 100,000 to 150,000 Cubic Feet per diem, about 20 feet high, 4 feet to 5 feet Diameter. Square or Rectangular Shape would be preferred.
Address the Manager, Gas-Works, Melksham.

OLD Gas-Works Dismantled by Com- petent Staff, and Best Prices Given for Old Materials.
Firth Blakeley, Sons, and Company, Limited, Thornhill, Dewsbury.

PURIFIERS—Wanted, Sets of 8 feet, 10 feet, and 12 feet square. Will Inspect and make Offer. Removed own Risk and Expense.
Firth Blakeley, Sons, and Company, Limited, Thornhill, Dewsbury.

PURIFIERS—For Sale Sets from 6 feet square to 20 feet square. Cheap and Good. Prices and Plans on Application.
Firth Blakeley, Sons, and Company, Limited, Thornhill, Dewsbury.

GASHOLDERS—Few, splendid Second- Hand in Stock from 2000 to 60,000 capacity. Overhauled and Erected in new STEEL TANKS cheap and Guaranteed. Plans and Specifications submitted. Entirely new quoted for.
Firth Blakeley, Sons, and Company, Limited, Thornhill, Dewsbury.

EXHAUSTERS—One set of Waller's Patent Three-Blade Combined with Steam-Engine, overhauled and perfect, to pass 15,000 and 20,000 cubic feet per hour. Also sets in stock for 2000 to 10,000 cubic feet per hour. Photos, Prices, &c., on Application.
Firth Blakeley, Sons, and Company, Limited, Thornhill, Dewsbury.

PRODUCER Gas Plants—150 and 300 H.P. GAS-PRODUCING PLANT, complete with Gas-Engines, Gasholders, and Carburetting Plant for Lighting Purposes. Delivered and fixed equal to new. Prices, Plans, and Particulars on Application.
Firth Blakeley, Sons, and Company, Limited, Thornhill, Dewsbury.

FOR SALE—Set of Four Water-Lute PURIFIERS, 12 feet square. Cockey's Centre Valve, extra deep Lute. In Good Condition. Bargain for a Works up to 40 Millions. Lifting Gear if required.
For further Particulars, Drawings, &c., Apply to G. Stevenson, Gas-Works, Long Eaton.

DARLINGTON CORPORATION.
(Gas-Works Department.)

TENDERS FOR STORES.

THE Gas Committee invite Tenders for the Supply of the following GENERAL STORES, to be ordered in such quantities as may be required during the period ending March 31, 1909:—
1—Brass and Meter Fittings.
2—Iron and Steel.
3—Ironmongery.
4—Lead Composition Pipe and Pig Lead.
5—Drysaltery.
6—Lubricating Oils, &c.
7—Oxide Paint, Red and White Lead.
8—Shovels, Coke Forks, &c.
9—Brooms, Brushes, &c.
Further Particulars and Forms of Tender may be obtained on Application to Mr. Frank P. Tarratt, Engineer and Manager, Gas-Works, Darlington.
Sealed Tenders, properly endorsed, must be addressed to the Chairman of the Gas-Works Committee, and sent in not later than Thursday, March 19, 1908.
No pledge is given that the lowest or any Tender will be accepted.
H. G. Steavenson,
Town Clerk.
Darlington,
March 7, 1908.

COLWYN BAY AND COLWYN URBAN DISTRICT COUNCIL.
(Gas Department.)

THE Gas Committee invite Tenders for the Supply and Erection, at their Gas-Works, Colwyn Bay, of a COAL-STORE and COAL ELEVATING and CONVEYING PLANT.
Plans may be seen, and Copy of Specification obtained, on Application to Mr. J. C. Pennington, Engineer, at the Gas Offices, Colwyn Bay.
Sealed Tenders, addressed to the Chairman of the Gas Committee, to be delivered at the Gas Office not later than Monday, March 16, 1908.
No Pledge is given for the acceptance of the lowest or any Tender.
James Amphlett,
Clerk to the Council.
Gas Offices, Colwyn Bay,
Feb. 24, 1908.

MOUNTAIN ASH URBAN DISTRICT COUNCIL.

TENDERS FOR TAR AND AMMONIACAL LIQUOR.

THE Council invite Tenders for the Surplus TAR and for the whole of the AMMONIACAL LIQUOR produced at the Gas-Works, Penrhiwceiber, during the Year commencing the 1st day of April, 1908.
Particulars may be obtained on Application to Mr. W. G. Thomas, Surveyor to the Council.
Tenders, prepaid and endorsed "Tar" or "Ammoniacal Liquor" (as the case may be), to be sent to me so that they be received not later than Ten a.m. on Tuesday, the 24th inst.
The Council do not bind themselves to accept the highest or any Tender.
By order,
H. P. Linton,
Clerk to the Council
Town Hall, Mountain Ash,
March 3, 1908.

BOROUGH OF CHORLEY.
(Gas Department.)

THE Chorley Corporation are prepared to receive TENDERS for the Supply, Delivery, and Erection of GAS COMPRESSING PLANT at their Gas-Works, Water Street, Chorley.
All Particulars as to Requirements, &c., may be obtained upon Application to Mr. J. W. Allin, Gas Engineer, Chorley.
Tenders, endorsed "Gas Compressing Plant," to be sent to me not later than Tuesday, the 17th inst.
The lowest or any Tender will not necessarily be accepted.
By order,
Jno. Mills,
Town Clerk.
Town Hall, Chorley,
March 3, 1908.

WALLASEY URBAN DISTRICT COUNCIL.
(Gas-Works Extensions.)

TO ENGINEERING CONTRACTORS, BUILDERS, AND OTHERS.

THE Wallasey Urban District Council are prepared to receive TENDERS for the Construction of a GASHOLDER TANK at the Gas-Works, Dock Road, Seacombe, Cheshire.
Plans may be inspected, and a Copy of the Specification and Bill of Quantities obtained, on Application to the Engineer, Mr. J. H. Crowther, at his Office, Dock Road, Seacombe, on payment of the sum of £5 (Five Pounds), which amount will be returned on receipt of a *bonâ-fide* Tender.
Sealed Tenders, on the Forms provided for the purpose, addressed to the Chairman of the Gas and Water Committee, and endorsed "Tender for Gasholder Tank," to be delivered, per post, at my Office, not later than Four o'clock in the Afternoon of Thursday, the 19th day of March, 1908. Tenders arriving after that time will not be considered.
The Contractor will be required to enter into a Bond with approved sureties for the due performance of the Contract.
The Council do not bind themselves to accept the lowest or any Tender.
By order,
H. W. Cook,
Clerk and Solicitor.
Public Offices, Egremont, Cheshire,
February, 1908.

THE Haworth Urban District Council are prepared to receive TENDERS for the Purchase of their Surplus TAR and LIQUOR during the Year ending March 31, 1909.
Tenders to be sent to me not later than March 23, 1908.
William Robertshaw,
Clerk.
Burlington Chambers,
North Street, Keighley.

COUNTY BOROUGH OF SALFORD.
(Gas Department.)

THE Gas Committee invite Tenders for the Supply and Erection of RETORT-HOUSE FLOORS, RETORT-FITTINGS, and STEEL MAINS required at their Albion Street Works.
The Drawings may be seen, and Copies of the Specification and Form of Tender obtained (for which a charge of £1 1s. will be made, to be returned on receipt of a *bonâ-fide* Tender) on Application to Mr. William W. Woodward, Engineer, Gas Offices, Bloom Street, Salford.
Sealed Tenders, endorsed "Tender for Retort-House Floor, &c." addressed to the Chairman of the Gas Committee, Town Hall, Salford, to be delivered to me not later than Three p.m., on Thursday, the 26th of March, 1908.
L. C. Evans,
Town Clerk.
Town Hall, Salford,
March 4, 1908.